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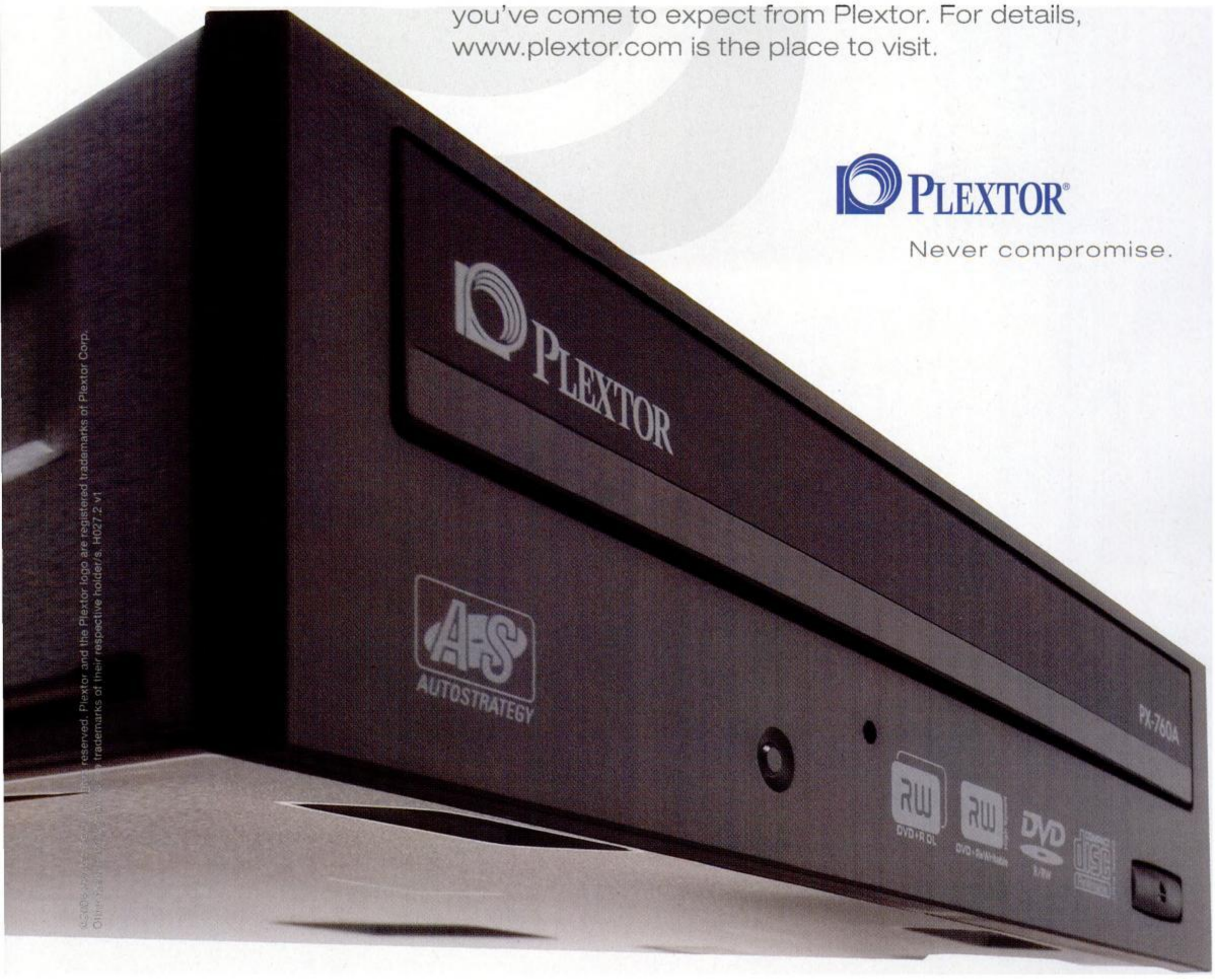

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Ed Word

iHardware Ain't for Me

Please send feedback and frosty chocolate milkshakes to ***will@maximumpc.com.***

In this month's "OS X vs. Windows XP" feature (page 48), we experiment with Apple's new *Boot Camp* software. *Boot Camp* lets Intel Mac owners run Windows XP on their Apple hardware. This is a step in the right direction, but it's really not what I—as a hardcore PC user—want. I really dig OS X; Apple's done a lot of things right with its OS, but its hardware is still crap.

Case in point, the poor sap who sent his overheating MacBook Pro in for service, and had it returned running just as hot. The user claims that Apple reps told him that 54 C (almost 140 F!) was the normal operating temp for the MacBook! Luckily, intrepid users dug deeper and found the problem. Upon opening the notebook, the culprit was obvious: too much thermal grease on the CPU, GPU, and chipset heat pipes. (You can read the whole story, with pictures, here: **http://tinyurl.com/eexth**.)

Anyone who's built his own PC knows, you apply a small daub of thermal grease to improve contact and heat transfer between your heatsink and CPU, but too much actually impedes your cooling. This is old news to *Maximum PC* readers, but apparently, Apple's service department doesn't read the mag. The company's service manual recommends what I would consider gross over-application of thermal grease on the chipset, GPU, and CPU coolers in Apple notebooks, to the tune of a whole tube of thermal grease *per component*. It's no wonder Apple's machines are running hot!

This just reinforces my longtime feeling that I can build a better machine than Apple. I tailor my rig for the types of activities I plan to engage in—whether I include a dual-core CPU for video encoding, a pair of videocards for gaming, or a ton of hard drive space for photo editing—my machine is designed for me. My rig will be better for me than any assembly-line machine, regardless of manufacturer. That's what I love about building my own machines.

So, what do I want? I'd like to be able to run OS X on my home-built rig, side-by-side with Windows XP and Ubuntu Linux. I don't want an iMac or an Apple-built tower—the company's design aesthetic is cool, but tight reveals and fancy industrial stylings aren't a substitute for a custom-built rig that I lovingly assemble with my own two hands.

My rig might not be as pretty as a Mac, but I sure as hell won't use three tubes of thermal grease when I put it together.

Will Smith

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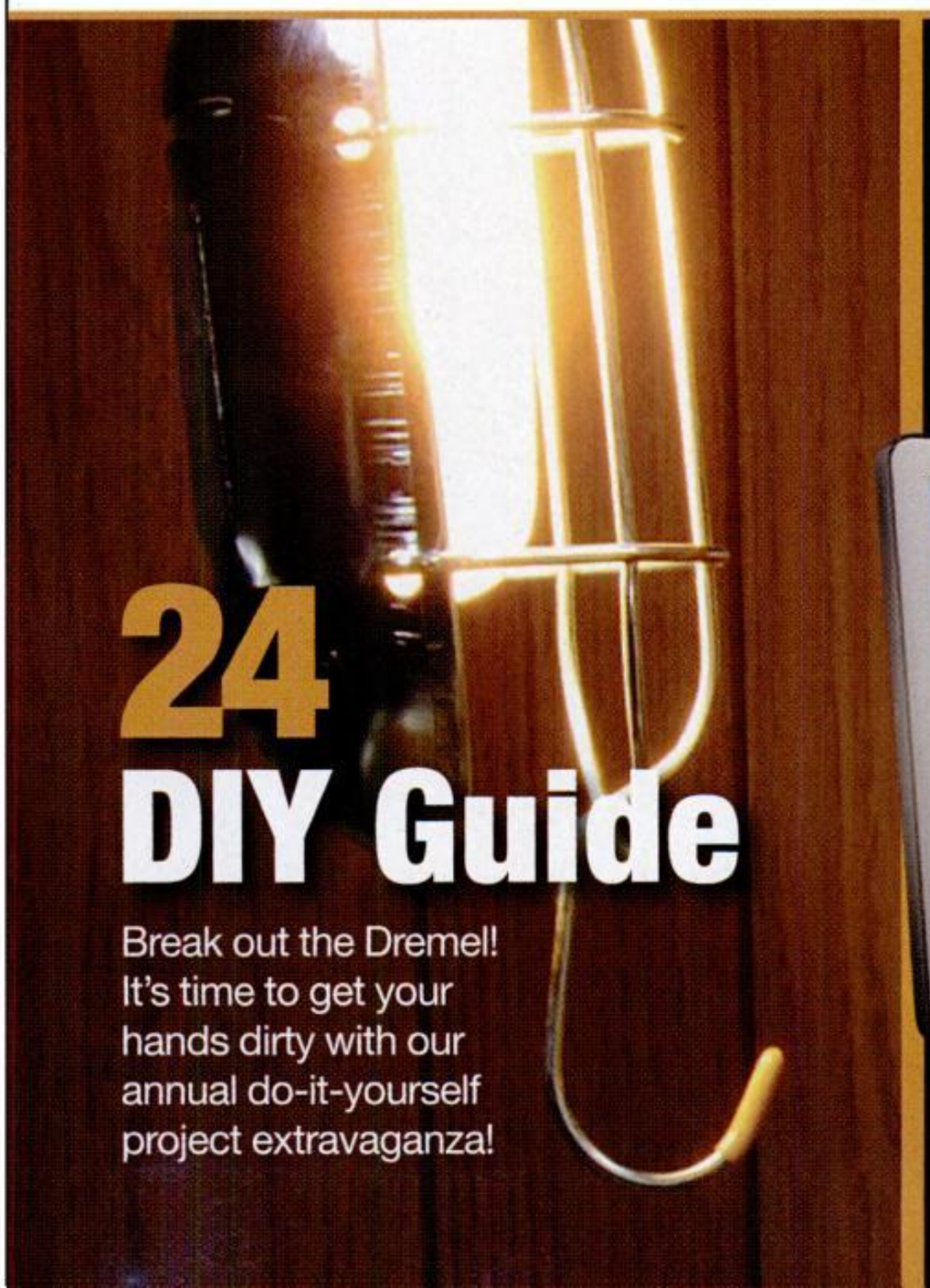

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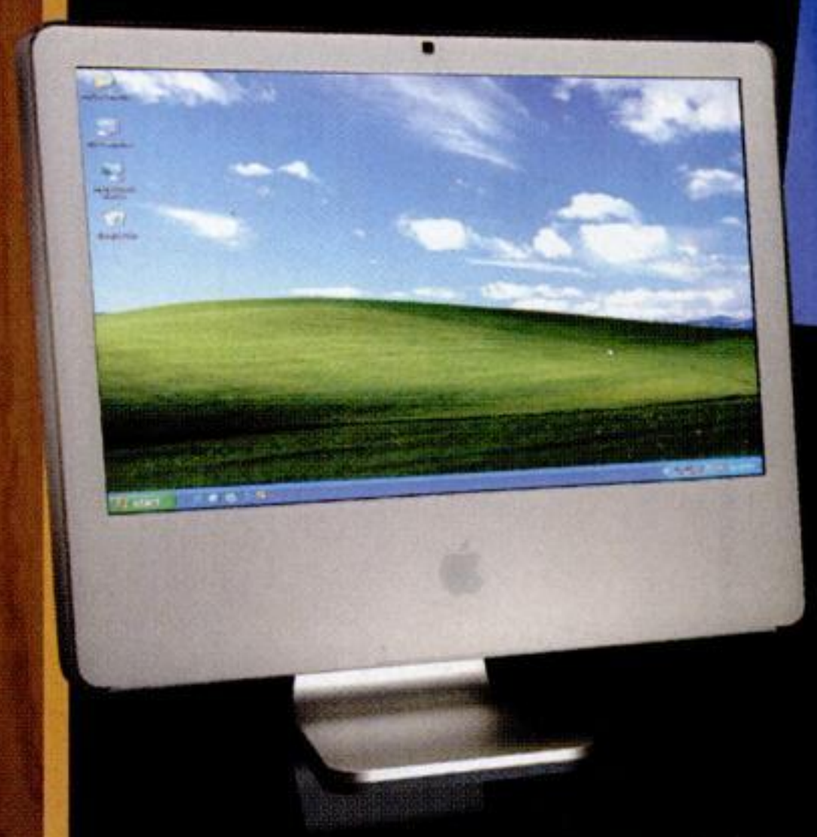

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Finally, an honest, apples-to-apples performance showdown between Apple and Microsoft.

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A Gun in a Knife Fight

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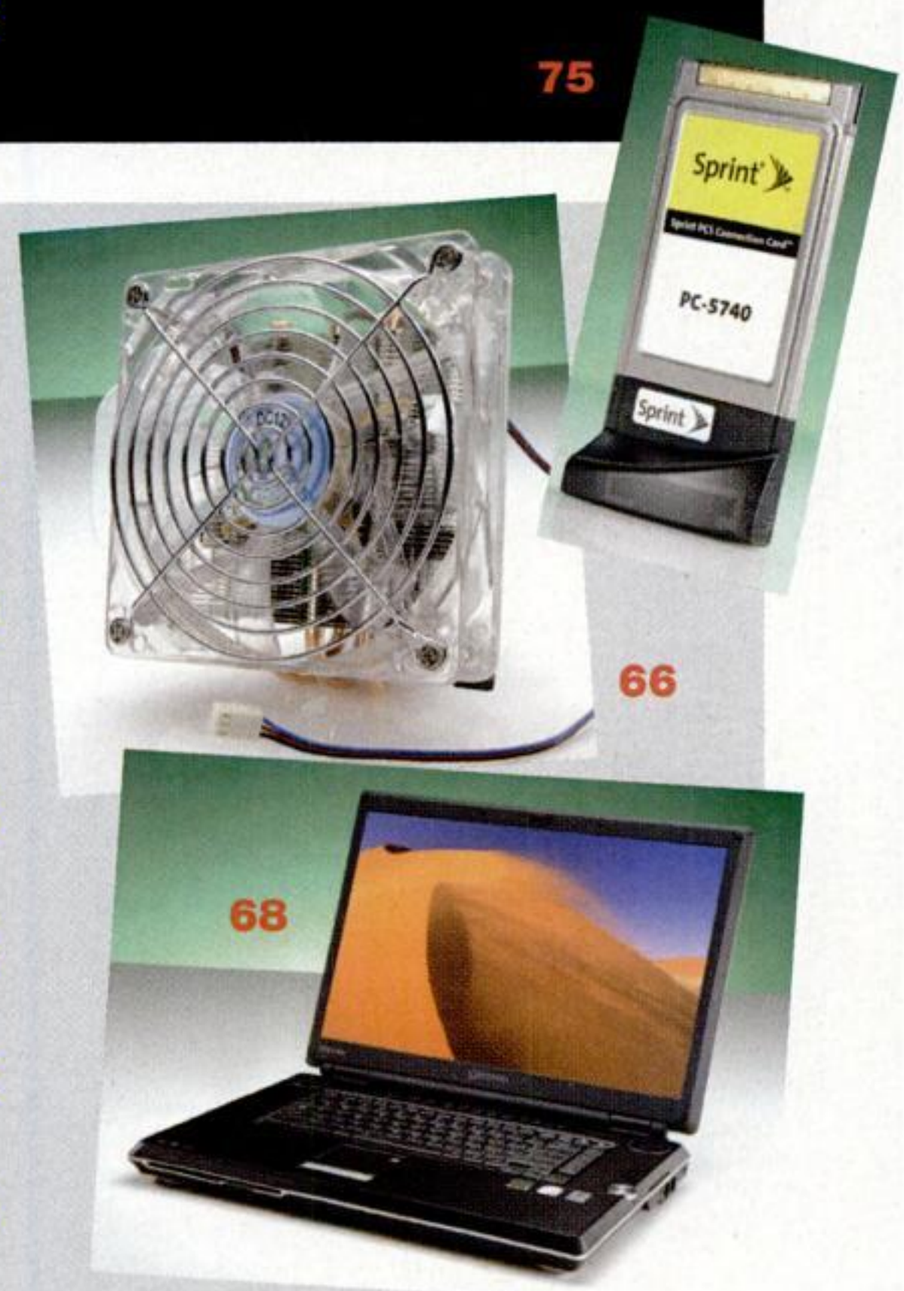

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The CPU Race Heats Up

Intel is seemingly prepped to take back the performance crown from AMD with its Conroe architecture. The question must be asked: What is AMD going to do about it?

And it's Intel by a hair! CPU benchmark futurists are already betting that Intel's upcoming Conroe CPU will smoke anything from AMD.

Though it's unfair to call a race before the ponies have been loaded into the starting gate, benchmark bookies and CPU aficionados alike are already calling the upcoming race between Intel's next-generation 65nm Conroe CPU and AMD's new 90nm Windsor (AM2) CPU in Intel's favor. Leaked comparisons of Conroe chips clocked at 2.6GHz and Athlon 64 FX-60s overclocked to 2.8GHz (AMD's expected launch speed for the Windsor CPU) show the vanilla version of Conroe being faster. What's worse, rumors of an "Extreme" version of Conroe, clocked in excess of 3GHz and bearing extra cache, raise the possibility that AMD's CPUs won't even finish in the money.

RUMORS OF AMD'S DEMISE ARE GREATLY EXAGGERATED

Of course, AMD says anybody predicting that the fat lady has sung for its K8 architecture is just drinking Intel's Kool Aid. AMD is quick to point out that Conroe is still months away from launch, and could be just a morning glory—that is, a horse that runs well in practice but chokes in the actual race. AMD insists that any comparison between its AM2 Windsor chip and Conroe isn't valid, and is simply foolish prognosticating.

THE ACES UP AMD'S SLEEVE

As usual, AMD officials won't talk about future products, but there are some indications of where the company is headed. With Conroe due for July release, it'll go head-to-head with AMD's DDR2-based Socket AM2 CPU. In 2007, the 65nm-based K8L CPU is scheduled to arrive with increased integer and floating-point performance. It might also support new instructions that will allow it to achieve parity with SSE4 in the Conroe chips.

Charting AMD's course beyond that is all conjecture, but we have a few ideas. In January, AMD paid Innovative Silicon for access to its Z-RAM technology, which increases the density of on-chip cache by up to 500 percent. AMD might be looking at beefing up its cache to compensate for the increased latencies of DDR2 memory.

AMD also shelled out $75 million to Rambus. Rambus holds the keys to the ill-fated RDRAM and is also the creator of the super-fast XDR memory that's being used in Sony's PlayStation 3. Rambus also controls patents to a speedy CPU interconnect technology called FlexIO (also used in the PS3). But as the creator of HyperTransport, AMD is unlikely to abandon that technology. Instead, AMD could be eyeing additional HyperTransport links to support up to 32-CPU configurations.

ANTI HYPER-THREADING?

Some of the more outlandish theories about AMD's next moves include the use of a vector co-processor. Cray is planning to use such a design in an upcoming supercomputer. Cray intends to use vector co-processors to communicate with the main processor over the HyperTransport bus. Co-processors optimized for specific operations are another possibility.

Other speculation includes AMD developing something loosely described as "Anti Hyper-Threading." Instead of making one processor act like two processors, as in Intel's Hyper-Threading, AMD would make four or more processor cores be seen as one core by the OS. French website X86-secret.com says the technique would greatly speed up performance of single-threaded apps, which currently get almost no boost from dual-core CPUs.

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No Hope for a Next-Gen Optical Merger

Blu-ray, HD-DVD talks end, both parties walk away for good

Call us optimists, but we've been holding out hope that Blu-ray and HD-DVD would eventually merge. "But *Maximum PC*," you say, "HD-DVD hardware is already shipping and all previous talks ended abruptly." We know that, but every time talks ended, the different parties always agreed to talk again. Now, however, it appears all talks are off and a merger is out of the question. And this time, they really mean it.

According to a Reuters article, an executive at Matsushita (one of the leading Blu-ray supporters) recently said, "We are not talking and we will not talk." The executive summarized his feelings on the subject by saying, "The market will decide the winner." Crap.

Preview

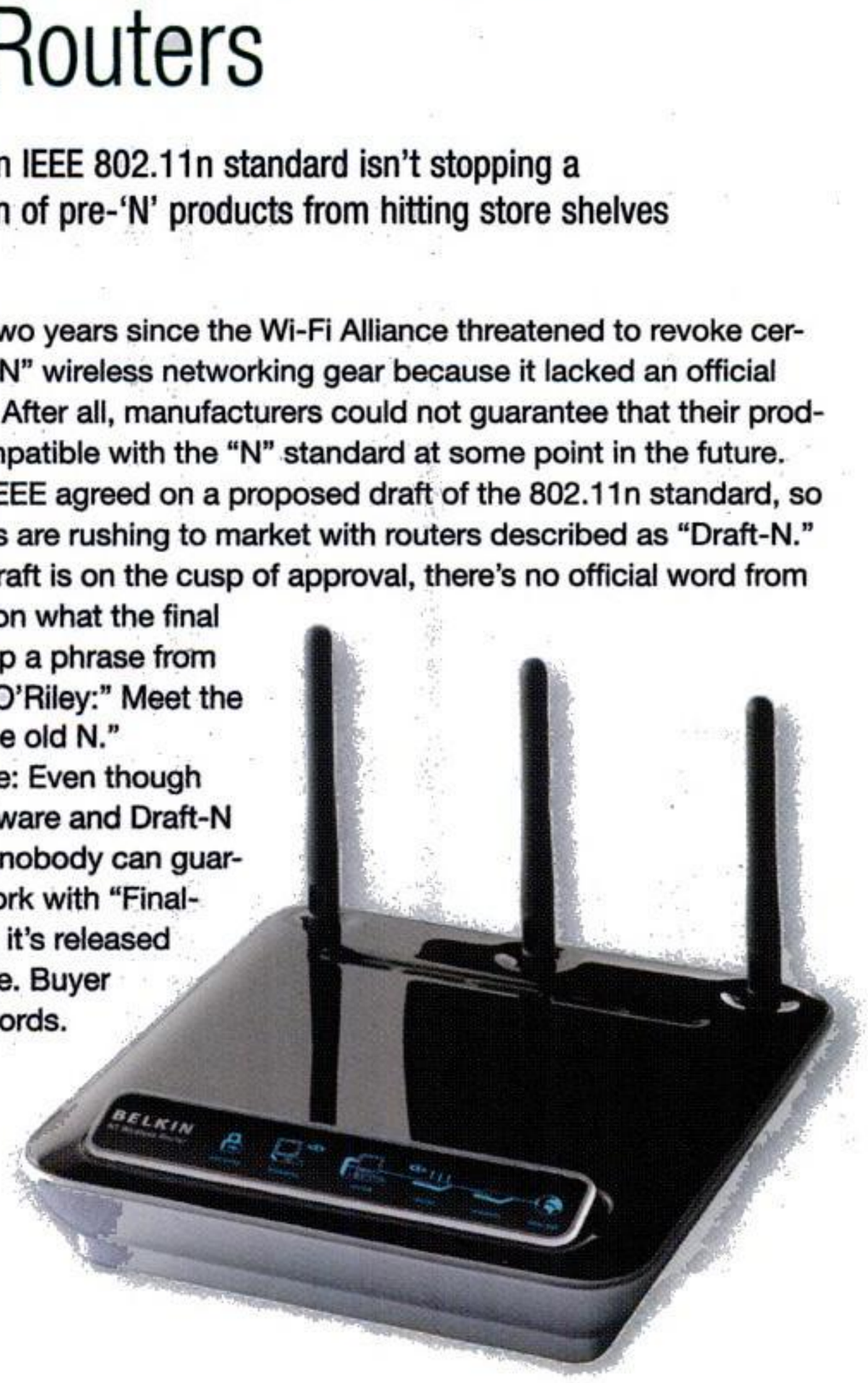
The Second Coming of Pre-N Routers

The absence of an IEEE 802.11n standard isn't stopping a second generation of pre-'N' products from hitting store shelves

It's been almost two years since the Wi-Fi Alliance threatened to revoke certification of "Pre-N" wireless networking gear because it lacked an official 802.11n standard. After all, manufacturers could not guarantee that their products would be compatible with the "N" standard at some point in the future.

Recently, the IEEE agreed on a proposed draft of the 802.11n standard, so now manufacturers are rushing to market with routers described as "Draft-N." Even though the draft is on the cusp of approval, there's no official word from the Wi-Fi Alliance on what the final spec will be. To cop a phrase from The Who's "Baba O'Riley:" Meet the new N; same as the old N."

The bottom line: Even though there's Pre-N hardware and Draft-N hardware for sale, nobody can guarantee either will work with "Final-N" hardware when it's released at some future date. Buyer beware, in other words.



FAST FORWARD

TOM **HALFHILL**

The Myth of Net Neutrality

For thousands of years, people have been paying more money for faster communication. In ancient times, a king or successful merchant could hire a fleet-footed courier or fast-riding horseman to carry an important message at top speed. Even today, overnight FedEx costs more than USPS Express Mail, and so forth.

This long-standing tradition has me puzzled by the raging debate over "network neutrality," which is the insistence that all Internet traffic should enjoy equal priority. To hear some people talk, any alternative is an outrageous violation of civil rights, and an affront to democracy. They're fighting a communications bill in Congress that would establish "tiered service," which would allow network carriers to route some data at a higher priority for a premium price. Opponents insist that all network traffic must be treated equally.

But nothing has ever worked that way, including the Internet. Dial-up service is available for less than $10 a month and is slow as hell. Regular DSL can deliver 1.5 megabits per second (Mb/s) and costs about $30 a month. High-speed DSL can deliver 3Mb/s for about $50. A dedicated T3 line gets you 45Mb/s and costs thousands of dollars a month. Everyone understands this basic concept.

Critics complain that without net neutrality, small online businesses won't be able to afford the same service as huge sites like Amazon and Google. That's like the owners of your neighborhood thrift shop whining because they can't afford a storefront on Rodeo Drive in Beverly Hills. Actually, it's worse, because the pricing for tiered service won't be nearly as disparate as that. Companies like Amazon, Google, Microsoft, and Yahoo are fighting against tiered service, because they are the bandwidth hogs that will have to start paying their fair share for all the traffic they generate.

If Congress allows tiered service, nobody except the largest bandwidth users will notice a difference. The Internet backbone has tons of capacity and keeps growing. Backbone routing plays a lesser role in overall packet throughput than your local Internet connection and the performance of the web server. In my opinion, vital network traffic should be a higher priority than teenagers gossiping about K-Fed in AOL chat rooms.

Tom Halfhill was formerly a senior editor for Byte magazine and is now an analyst for Microprocessor Report.

GAME THEORY

THOMAS MCDONALD

Welcome Back, Lara

There haven't been many iconic characters in the PC game world, especially compared with console land. We don't have a Mario, Sonic, or Pikachu (and for that we should be eternally grateful, I suppose). Supposedly, your character in *Doom* is named John Grimm, but that doesn't count.

The reason for this disparity is fairly obvious. PC gaming is dominated by three types of games: strategy (in which there is a direct correlation between attempts at characterization and the increase in tedious narrative sequences you need to skip); role-playing (which has many different characters, most of them uninteresting); and shooters (in which you are the homicidal gunman). None of these genres is driven by a single character. At least, not the good ones. I could play most of *Half-Life/Half-Life 2* without really knowing that Gordon Freeman looks like Wally Cox. Again, this is a good thing.

It took the shift to third-person action gaming and a pair of pneumatic breasts to give PC gamers their first icon of any lasting import. Lara Croft became a gaming icon for two reasons. (No, really, I mean there are actually two reasons. You people have one-track minds.) First, you could actually see her. A lot of things get forgotten in the time-line of PC gaming, but the fact that *Tomb Raider* was one of the first third-person action games was a key to its success. This was something fresh.

Second, she was a well-designed character. Sure, her twin peaks were a factor, but it was simply logical that, if the largely male gaming population was going to look at a proxy character for 20 hours, why not make that character your basic dream-female? I often pick female avatars, not because I harbor a secret need to express my feminine side, but because I'd rather look at them for long periods of time.

Lara's importance may have been diminished in the last few years by stupid ads, a couple of bad movies, and many bad games, but her return in *Tomb Raider: Legends* is unexpectedly welcome. That's partly because it's a decent game overall, and partly because, for PC gamers, she was our first.

Tom McDonald has been covering games for countless magazines and newspapers for 11 years. He lives in the New Jersey Pine Barrens.

Ripping CDs=Funding Terrorism

We've griped ad nauseam about the invasive Digital Millennium Copyright Act (DMCA). This law makes it illegal to circumvent copyright protection on movies and music, even if your actions can be described as "fair use," such as transferring a song or movie to a portable media player. Digital-rights enthusiasts have long hoped the law would be repealed or watered down, but it appears that some members of Congress are preparing to do the exact opposite.

Named the Intellectual Property Protection Act of 2006, the draft version of the new law—which hasn't been officially presented yet—will expand the provisions of the DMCA, and impose stiff new penalties on software and media pirates while expanding the definition of piracy.

Attorney General Alberto Gonzales revealed the impetus for the Bush administration's proposed legislation in a speech last November. He said that new technology brought "large-scale criminal enterprises" into the copyright-infringement party, and went on to make the laughable claim that infringement practices were used "to fund terrorism activities."

The new bill contains an assortment of proposals to combat piracy, including a clause that would make "attempting" to commit copyright infringement illegal. Attempting to commit copyright infringement could include anything from posting songs on file-sharing services (definitely illegal) to searching Google for your favorite band and finding an illegal MP3 as a result.

Naturally, the music industry is pushing hard for this bill to become law. Contact your government representative if you think otherwise.

Apple is Watching You

Apple recently applied for a patent that is either Big Brother scary or unbelievably cool. The patent is for a display that sandwiches image-capturing sensors between image-displaying cells, creating an LCD screen that's also a camera. It could be awesome for videoconferencing, and we're pretty sure all those wild webcam teens will like it as well.

TDK Preps Eight-Layer Blu-ray Discs

With Blu-ray about to ship (so we're told), TDK is developing its next-gen dual-, quad-, and octal-layer recordable media. The company's first Blu-ray media will be single-layer 25GB discs, but TDK has announced that it's working on 50GB, 100GB, and even eight-layer 200GB discs. According to TDK, first-gen media will be rated at 2x read speeds, but its four-platter design will be three times faster.

Microsoft Gets Physical

Just as we went to press, word came over the wire that Microsoft is developing a physics API, presumably named DirectPhysics. According to The Inquirer website, not much is known other than the fact that it exists. Such an API would help unify the emerging world of physics acceleration, which is currently divided between two main APIs: Havok's and Aegia's.

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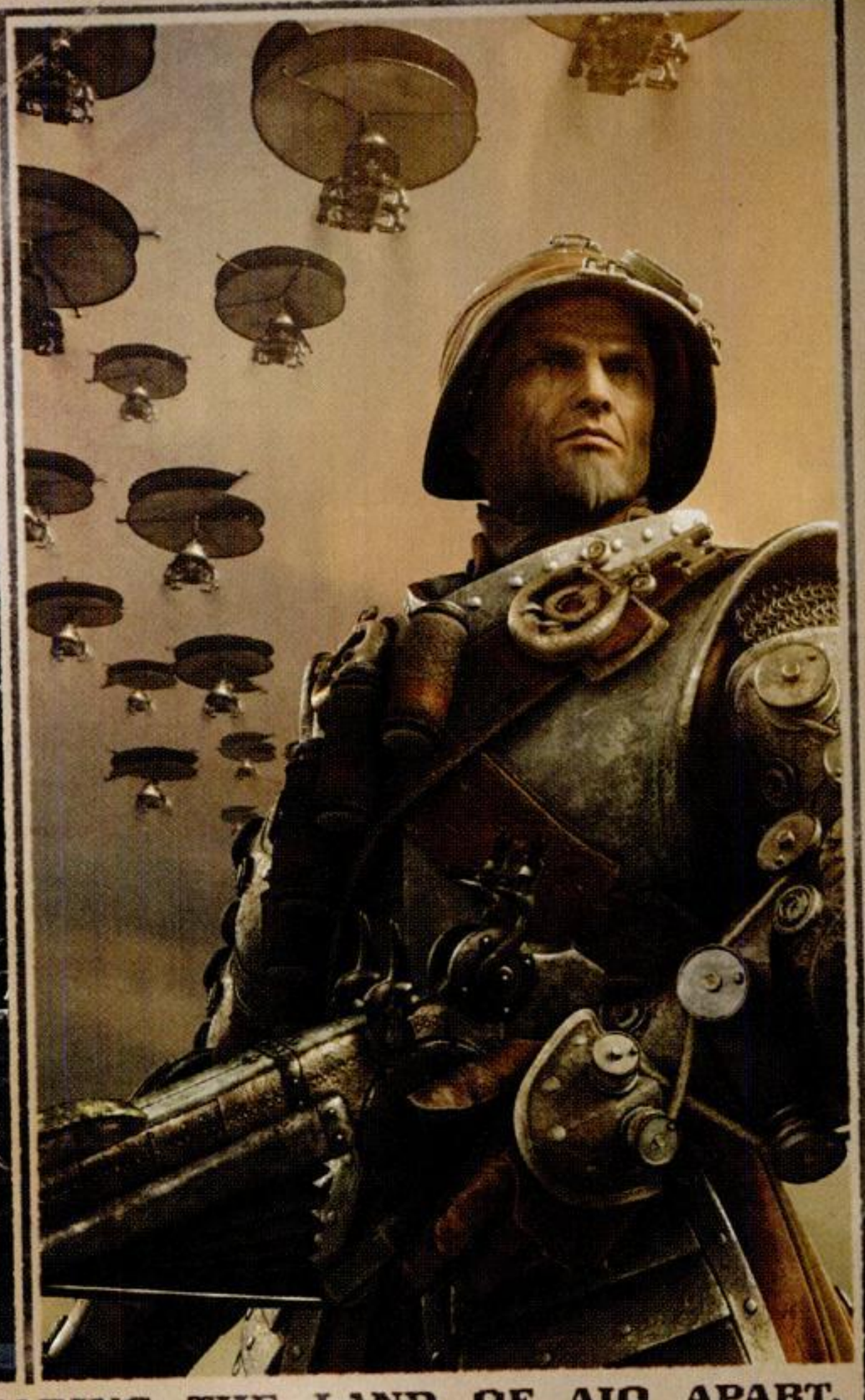

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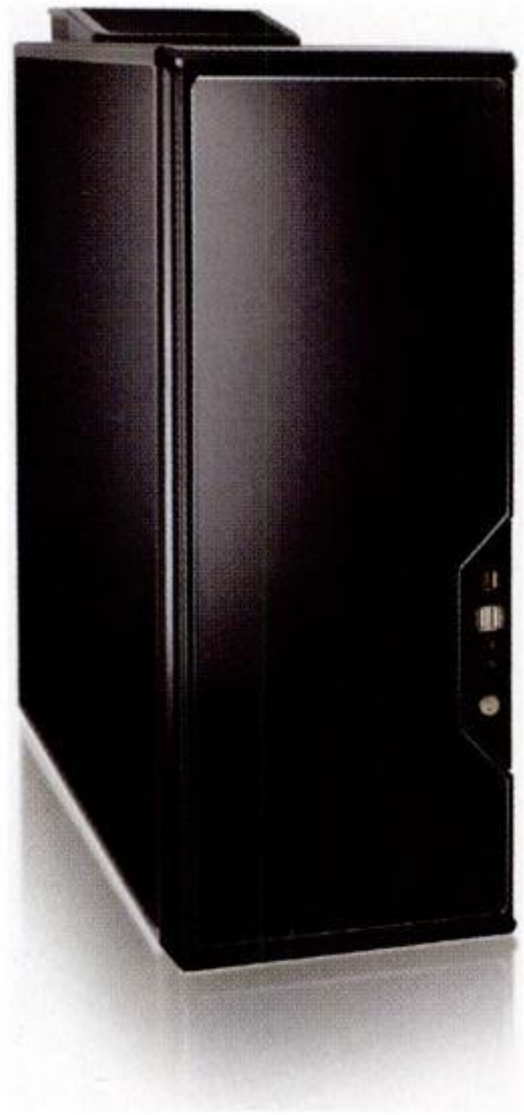

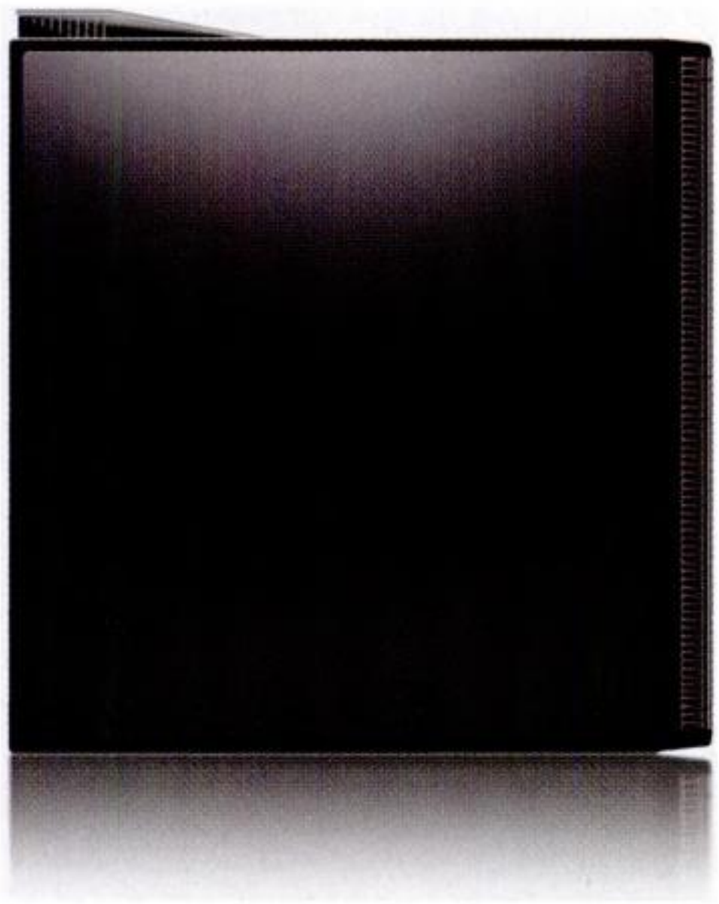

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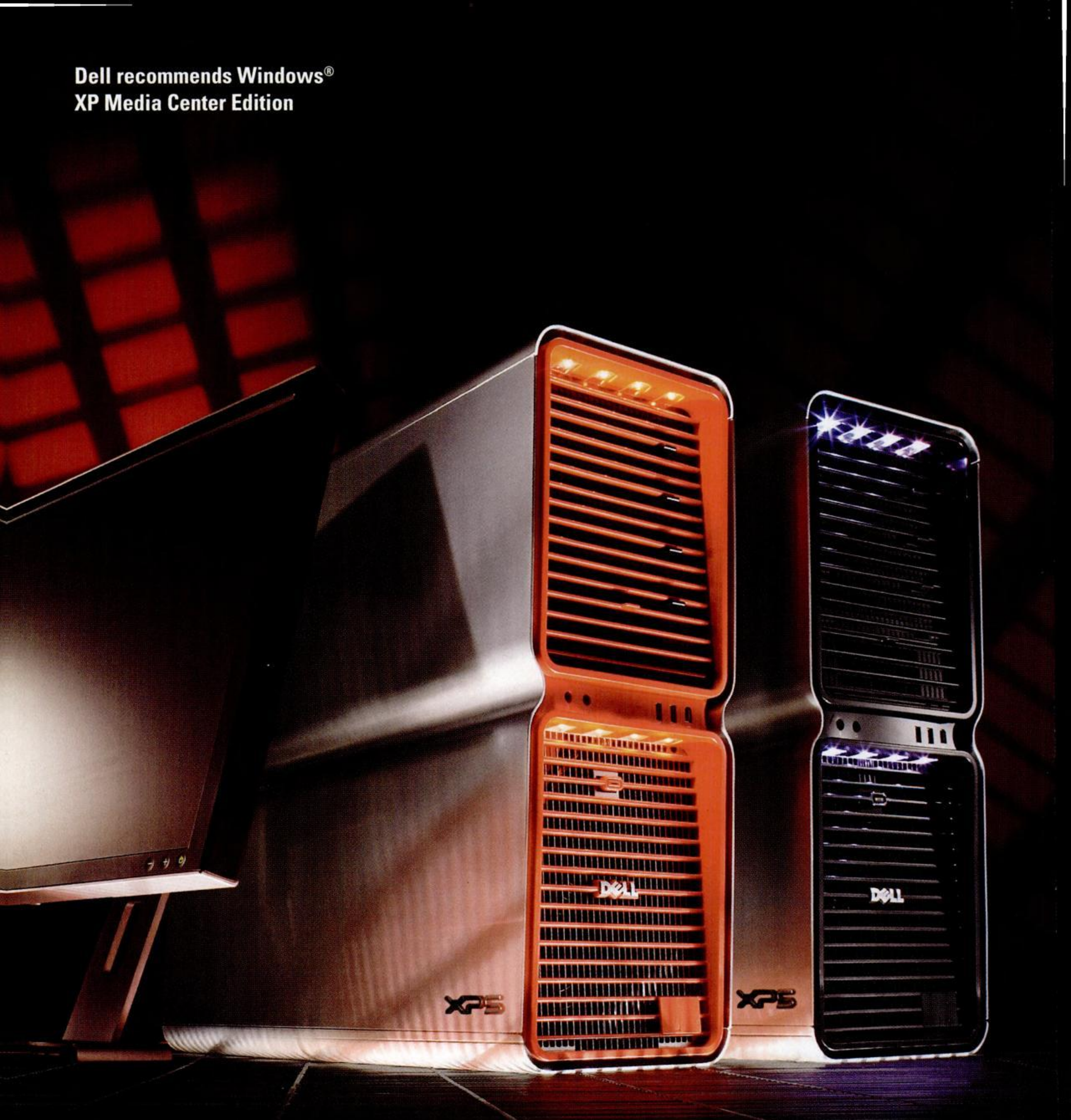

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Multi-Function **vs.** Single-Function Printer

When you build your fantasy baseball team, do you want a slugger who can't run or field but can knock them out of the ballpark, or a balanced player with more moderate batting statistics? That used to be the question consumers faced when choosing a printer: get a jack-of-all-trades multi-function printer or the single-function photo printer? But does that hold true today? Just as CPUs and graphics cards have advanced, so has printer technology. To find out where the chips fall in the different printer camps, we compare two $200 printers from the same manufacturer—a single-function Canon Pixma iP6600D and a multi-function Canon Pixma MP500. The six-color iP6600D is a dedicated photo printer, but it also works fine printing your documents or directions from Mapquest. The MP500 is optimized for home office work, with scanner and copying capabilities, but it's competent enough in photo printing that Canon bills it as a "photo all-in-one."

BY GORDON **MAH UNG**

SINGLE-FUNCTION PRINTER
Canon PIXMA iP6600D,
$200, www.canonusa.com

round 1 **FEATURES**

Both printers work well, even if they're not connected to a PC. Both let you print by inserting a memory card directly into the built-in card reader or by hooking your digital camera to the printer's USB port. For direct printing, the iP6600D's 3.5-inch LCD screen gives it the photo-viewing edge (the multi-function printer sports a mere 2.5-inch LCD). But what do you do when you want to make copies? The built-in color copier of the MP500 is amazingly handy for quick copies when your PC is off. And it also doubles as a competent flat-bed scanner when your machine is turned on.

WINNER: MULTI-FUNCTION PRINTER

round 2 **COST PER PRINT**

Ink costs vary depending on your print jobs and the type of paper you print on, but assuming you had to replace all the cartridges on the printer at once, restocking the MP500 would set you back about $62, while the photo printer costs about $72. It seems pretty close, but because the MP500 uses the slightly higher-capacity PGI-5 black cartridge, it has the edge.

WINNER: MULTI-FUNCTION PRINTER

round 3 **FOOTPRINT**

The physical footprint of both printers is pretty similar when you have paper in the feed tray and the output tray is fully extended. But the MP500's formfactor and shiny black top made us think a Humvee had landed on our desk. Next to the MP500, the iP6600D looks practically dainty. It's easy to put the size category in the iP6600D's corner, but not all multi-function printers are so ginormous.

WINNER: PHOTO PRINTER

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round 4 PERFORMANCE

To test the printers, we hooked each one up to our standard test bed via the printer's USB 2.0 port. We printed our 30-page benchmarking guide in Microsoft *Word* format on plain paper, and we also timed how long it took each printer to print 10 4x6 photos and two letter-size photos on Canon's Photo Paper Pro paper. The results were split. The MP500 spit out the 30-page document with almost two minutes to spare. When we got to photos, the iP6600D shaved a minute off the multi-function's time for the 8.5x11-inch photo and about 30 seconds printing the 4x6 photos. The upshot: Canon figures the MP500 will pull more plain-paper printing and copying (no surprise), while the iP6600D will spend most of its life digesting photo paper. Keep in mind that our results with the Canon printers won't apply to other manufacturers' printers. Canon's use of nozzle-heavy print heads gives it a huge speed boost over the other guys when printing photos.

WINNER: TIE

round 5 IMAGE QUALITY

When printing text and graphics on plain paper, both were even, as we expected. It's the photo printing that really separates the men from the boys. To judge image quality, we printed various photos shot on 12.8MP digital SLRs and a few older images scanned in via film scanners. The results were amazingly close. We thought the photo-optimized iP6600D would kill the MP500, but both printers produced amazingly vibrant and colorful images that were free of grain and banding at normal viewing distances. On close examination, we did find the "grain" structure of the iP6600D to be slightly better than the multi-function's, but that was with a loupe and the differences were very, very slight. We suspect that there are situations where the wider color gamut of the iP6600 would ace the MP500, but we couldn't find test images that demonstrated a shortcoming.

WINNER: TIE

MULTI-FUNCTION PRINTER
Canon PIXMA MP500, $200, www.canonusa.com

BENCHMARKS

	iP6600D	MP500
Print 30-page Word document with images (min:sec)	11:25	**9:21**
Time to print two 8x10 photos (min:sec)	**4:02**	4:36
Time to print 10 4x6 photos (min:sec)	**8:20**	9:20
Image-quality rating	Very Good	Very Good

Best scores are bolded.

And the Winner Is...

Coming into this, we really thought we'd have a split with the multi-function winning for versatility and the photo printer winning for image quality. But when we take into account the multi-function's surprisingly good image quality and decent photo print speed, along with its slightly cheaper ink and its ability to scan and copy documents, this one is an easy win for the multi-function printer. Photo purists might still opt for the better color gamut of the straight photo printer, but for everybody else, a good multi-function more than does the job. With these results, it's no surprise that multi-function printers are strangling the sales of the single-function competition. MPC

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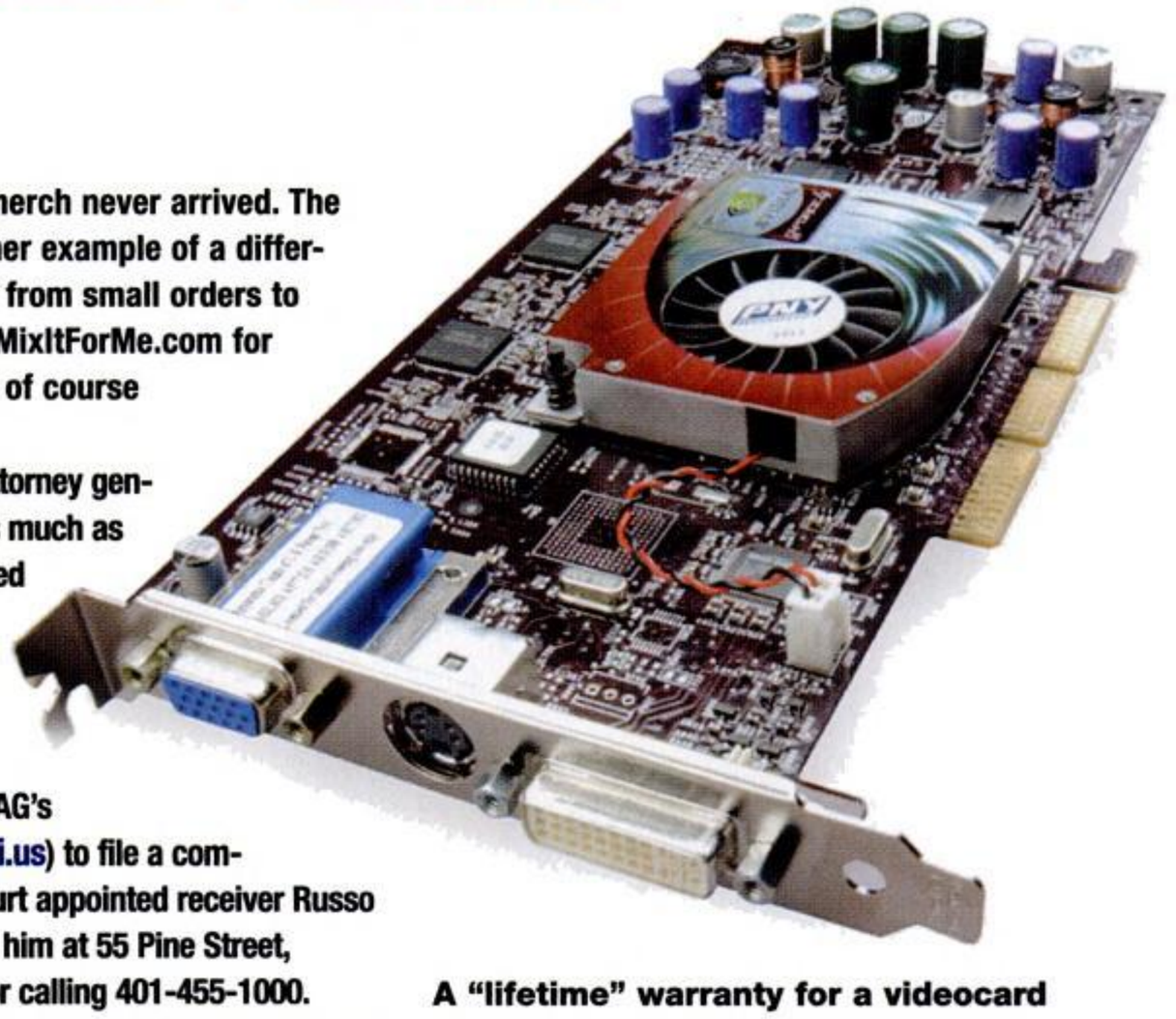
Our consumer advocate investigates...

✓MixItForMe.com ✓PNY ✓Comcast ✓Hewlett-Packard

Ace, Watchdog of the month



MIXED UP MIXITFORME.COM

*I hope you can help me with a problem I'm having with a company called Mix It For Me (**www.mixitforme.com**). Back in September I ordered an iPod Nano but never received it. I requested a refund and received a check, but it bounced. I've tried calling the company but the number is no longer in service.*

— David Vuong

Bad news, David: You and numerous other customers are in for a long wait. Federal agents with the U.S. Secret Service, FBI, U.S. Postal Inspectors, and Providence Police raided the offices of Mix It For Me in late March. The week before, the company's bank forced it into receivership to get back $900,000.

According to news reports, MixItForMe.com left a lot of people blowing in the wind. Many of those hurt by the implosion were Internet dealers who believed Mix It For Me was safe. Often, after successfully completing smaller transactions, dealers moved on to larger purchases, and suddenly found those orders stalled. One dealer quoted in the *Providence Journal* newspaper said he initially purchased 10 Motorola Razr phones to resell. When that deal went without a hitch, he ordered another 200, wiring $23,000 to MixItForMe.com. The merch never arrived. The *Journal* cites yet another example of a different retailer graduating from small orders to a $47,000 payment to MixItForMe.com for 260 iPods, which were of course never delivered.

The Rhode Island attorney general's office says that as much as $15 million could be owed to consumers and dealers by Mix It For Me. Folks caught up in the crash are being asked to contact the RI AG's office (www.riag.state.ri.us) to file a complaint, as well as the court appointed receiver Russo Ferrucci, Esq, by writing him at 55 Pine Street, Providence, R.I. 02903, or calling 401-455-1000.

Where did the cash go? An earlier *Providence Journal* story had one of the owners, Cory Johnson, citing "cash flow" problem with the company. Johnson told *Journal* reporter Paul Grimaldi that the company that managed its credit-card transactions was holding the cash instead of paying the manufacturers for the goods: "We grew so quickly, some of the infrastructure wasn't in place," Johnson said. Sure.

Law enforcement officials say they're still trying to sort out what exactly happened with Mix It For Me, but no criminal charges have been filed. Woof.

The implosion of MixItForMe.com stiffed one reader out of his iPod Nano, and others out of a ton of cash.

LIFETIME OF THE PRODUCT CYCLE

I was given a PNY Technologies Verto 5950 Ultra 18 months ago. Up until four months ago, all was fine. Then I started to get green lines and random text across the screen during boot. I thought it was a bit weird, but XP and games ran fine. Eventually, I started to see green blocks and corruption in the XP splash screen and artifacts during games. Now the card is unusable, you get "scrambled eggs" on boot, and it looks like Windows loads but the display is total garbage.

When I contacted PNY about the "lifetime warranty" on the card, I was told that it applies only while the card is in production. There is no upgrade program, no support, no nothing.

— Gus Dorantes

A "lifetime" warranty for a videocard sounds comforting, but the definition of that term can vary wildly among manufacturers.

The Dog decided to take a look at PNY's stated lifetime warranty and how it stacks up against other companies.

- **PNY: "...lifetime is defined as the lifetime of the product on the market. Outdated technology is not covered by lifetime warranty if the item is no longer available on the common market as a new product..."**
- **BFG: "...is proud to warrant the original purchaser of the graphics card included in this package that the Product will be free from defects in material or workmanship for as long as the original purchaser owns the product..."**
- **eVGA: "...lifetime warranty is valid for the life of the retail product, so long as the original purchaser owns the product, based upon the following conditions: Lifetime warranty is for all retail Graphics Card and Mainboard products ending in the part numbers AX, DX, or FX..."**
- **VisionTek: "...is pleased to warrant to you,**

Got a bone to pick with a vendor? Been spiked by a fly-by-night operation? Sic The Dog on them by writing **watchdog@maximumpc.com.** The Dog promises to answer as many letters as possible, but only has four paws to work with.

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the original purchaser of the hardware products included in this package, that the products of its manufacture will be free from defects in material or workmanship for the lifetime of the product when given normal and proper usage…"

Of the four manufacturers, PNY appears to offer the shortest "lifetime" warranty, especially when you consider the typically brief lifetime of a graphics card on store shelves. While the other warranties seem to be pretty straightforward, the Dog thinks you should apply reasonable expectations to any lifetime warranty. While you can expect your 7800 GTX to be replaced after, say, two or three years, should you really expect a replacement after 10 years? Probably not.

Eric Arnum, editor of industry website WarrantyWeek, agrees, saying he's always curious when he sees a lifetime warranty. Because everything except the great pyramids eventually wears out, consumers shouldn't expect perpetual coverage, particularly from a company that's only two years old.

"It's the lack of a concrete definition that makes me skeptical," Arnum told the Dog. Arnum admits, however, that there are companies that truly honor a long-term commitment. Some high-end sporting-equipment vendors, for example, replace items after 20 years of use. And the Dog is aware of companies that offer plain-English warranties good for the life of the company, not just the product.

What does PNY think? As of press time, the company had not responded to the Dog's requests for comment.

LIMITED UNLIMITED

I recently received a phone call from Comcast's abuse department claiming that I was "using too much bandwidth." When I asked how much is too much, the caller said he couldn't give me a number. I asked if the service was unlimited and he said no. So I asked what the limit is and was again told that he could not give me a number. Huh?

So basically Comcast has set an arbitrary limit, which I'm not privy to, and if I exceed that mysterious limit, I can be cut off?! Why can't Comcast just give me a number, why doesn't the policy state that number, and why does that annoying "Comcastic" advertising campaign not state the limits of the service? Can you find out for me?

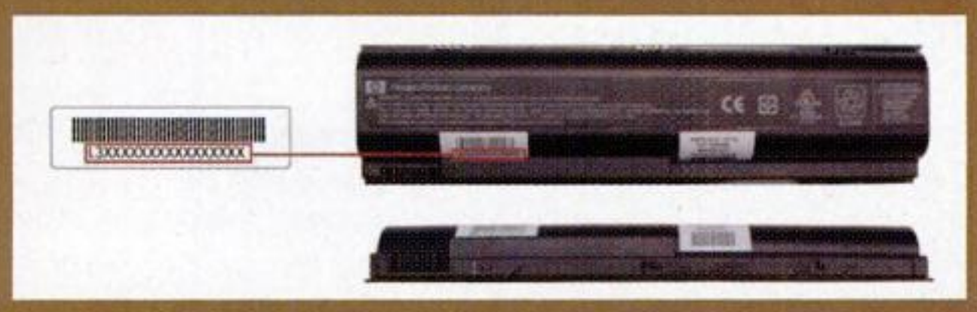
—Jeff T.

The Dog spoke to a Comcast official who said she could not provide a hard number for the limit, either. She did say, however, that 99.999 percent of Comcast's customers don't exceed the limit. And she gave examples of things that definitely exceed the limit, such as sending 13 million emails, sending and receiving 256,000 photos, or downloading 30,000 songs—all in the same month. To use the latter example, that works out to about 1,000 song downloads a day. If the songs are 3MB per song, that amounts to about 3GB, which could easily be eaten up by a few large Linux ISO distros or a download of Sun Solaris 10 (five CDs worth of data). Of course, Comcast's issue doesn't concern the occasional big download, but rather a 3GB-per-day habit over a month or more. The company official said most bandwidth problems occur when a PC has been taken over by a hacker and is being used as a distributed-DoS zombie.

Still, the fact that Comcast will slap your hand for stepping over a line that it won't quantify is frustrating, to say the least. The official said she could have a technician contact Jeff to help him with the matter, but Jeff told the Dog that he had already let his money do the talking and was in the process of switching to DSL. Woof. MPC

Recall **Alert**

HP is recalling some 15,700 batteries that could overheat, melt, and pose a burn or fire hazard. The batteries were sold with HP Pavilion DV1 and ZE2 series, HP Compaq NX48 series, and Compaq Presario V2 and M2 series notebook computers. The batteries were manufactured in early January 2005 and were sold between January 2005 and December 2005. The bad batteries have a bar code that starts with L3. Anyone with the bad battery should immediately stop using it and contact HP at 888-202-4320 between 7 a.m. and 7 p.m. Central time, Monday through Friday, or visit www.hp.com/support/BatteryReplacement for more information.



Hewlett-Packard is recalling about 16,000 notebook PC batteries that could overheat and catch fire.

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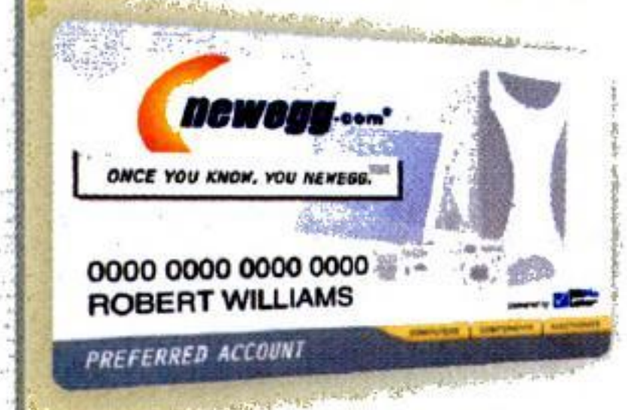

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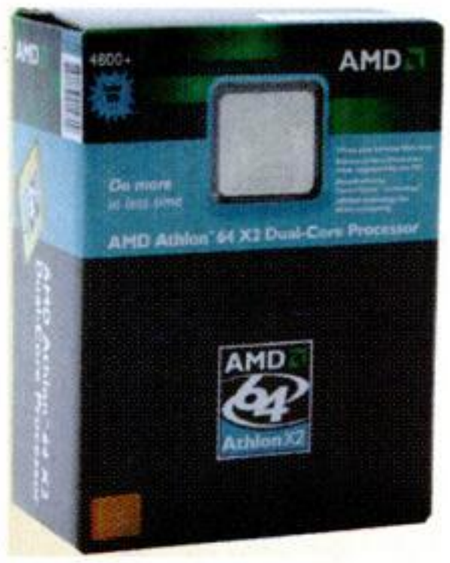

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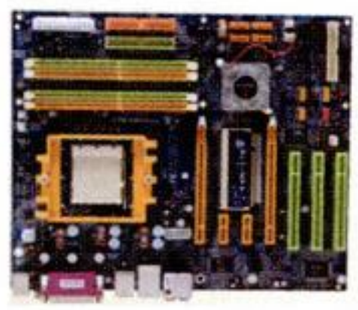

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MAXIMUM PC's Do-it-

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Do-It-Yourself Guide

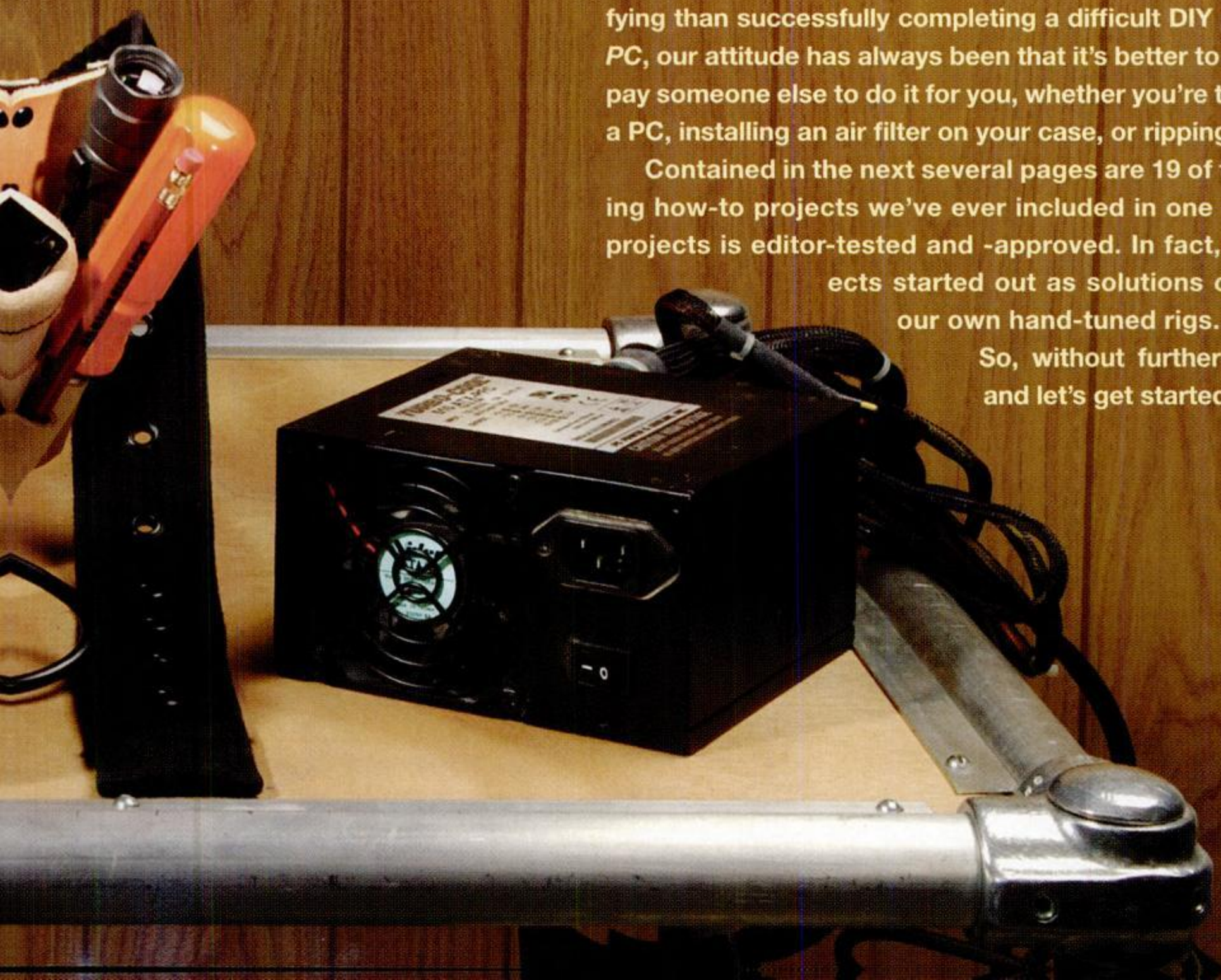
Grab your toolbox, get out your Dremel! The following pages contain 19 of the best, most high-impact DIY projects you've ever seen for your PC!

BY THE MAXIMUM PC STAFF

Whether you're an accomplished hardware hacker or a neophyte picking up a screwdriver for the first time, there are few things more satisfying than successfully completing a difficult DIY project. At *Maximum PC*, our attitude has always been that it's better to do it yourself than to pay someone else to do it for you, whether you're talking about building a PC, installing an air filter on your case, or ripping your CDs to MP3.

Contained in the next several pages are 19 of the best, most exciting how-to projects we've ever included in one story. Each of these projects is editor-tested and -approved. In fact, most of these projects started out as solutions or improvements for our own hand-tuned rigs.

So, without further ado, turn the page and let's get started!



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CONNECT YOUR PC TO YOUR HDTV

Connecting your computer to a high-def TV can be very tricky; here's a quick and easy guide to get your PC talking to any display.

Before connecting anything to your HDTV, set your videocard to a resolution the display supports. If it's a flat screen, set the card to the screen's native resolution. You might need to remove the checkmark next to "Hide modes this monitor does not support" in order to expose additional predefined settings; if you still don't find the resolution you need, use the videocard's driver to create a custom resolution.

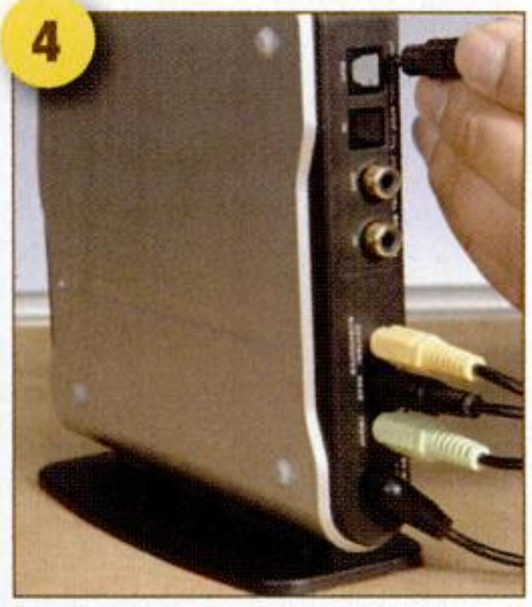
Late-model high-def TVs are outfitted with either DVI or HDMI connectors, the latter of which carries both digital video and multichannel digital audio on the same cable. A simple DVI cable will handle DVI connections, but because you won't find any videocards with HDMI outputs, you'll need to use either a DVI-to-HDMI adapter or a cable with a male DVI connector at one end and a male HDMI connector at the other.

Older high-def TVs rely on component analog-video connections. In this situation, you'll need to plug an adapter cable into your videocard that outputs its analog signal to three separate cables (Y, Pb, and Pr). This is a common feature on high-end ATI and nVidia cards. You should be able to purchase a cable that has a male VGA connector at one end and component analog-video connectors at the other.

CAUTION!

Setting incorrect scan and/or refresh rates can permanently damage your monitor. Don't tweak these settings without first consulting your monitor's user manual.

Older videocards and HDTVs might require some tweaking before they'll play nice together, especially if you're using analog connections. Unlike computer monitors, most HDTVs support a limited number of resolutions and will sync only to a narrow range of scan rates. You might also need to make adjustments for overscan (to correct an image that extends beyond the edge of the display) or underscan (to eliminate black borders around the image). If you're using an nVidia card, click the Advanced Timing button, and then read and agree to the warning message to access these settings. If you're using an ATI card, you'll need to use EnTech's *PowerStrip* utility (ATI no longer exposes these controls in its latest drivers). You can get *PowerStrip* at **www.entechtaiwan.com/util/ps.shtm**. You should be able to find the info you need to configure a custom resolution in your TV's manuals.



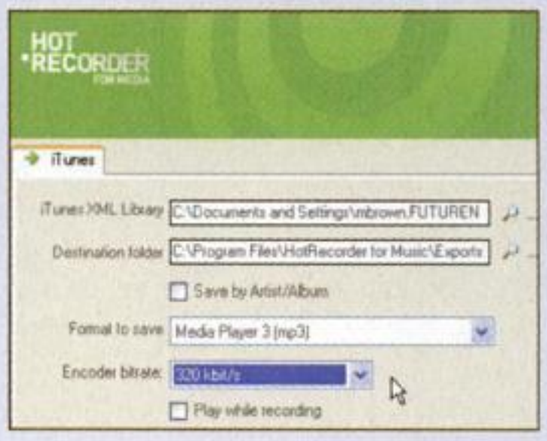
Connecting your PC's audio to your home-theater system can be problematic. If your A/V receiver isn't equipped with six discrete analog inputs, you have no way of playing DVD-Audio or Super Audio CD content, which must be transported in the analog domain. If you find yourself in this situation, pick up Creative's Home Theater Connect DTS-610 and integrate it into your system. Plug your PC's analog-audio output into it and the device will encode the 5.1-channel sound to DTS and output it over an optical SPDIF or coaxial TOSLink connection to your receiver.

ORGANIZE YOUR MP3S

If your music collection is anything like ours, it's a mess. If you want to clean up the tags on those old tracks, *Media Monkey* (**www.mediamonkey.com**) is the perfect utility.

It's super simple. First make a backup of your MP3 collection in case of disaster. Then import the collection you want fixed into *Media Monkey*. Then go to Tools, and Auto-Tag from Amazon to automatically fix all your track tags.

RIP SONGS FROM ITUNES



Hot Recorder for Music (**www.hotrecorder.com**) converts songs you've purchased on iTunes into MP3 or WAV files, so you can play them on any MP3 player. Click the Options menu, choose Preferences, and pick which format you wish to use (MP3 or WAV). If you choose MP3, you'll also need to decide on a bit rate. Lastly, assign a file extension (e.g., MP3) and click the Save It button.

Drag the tunes you wish to convert from the left window to the right and click the Convert button. The conversion occurs in real time, meaning a five-minute song takes five minutes to convert—so you should avoid running any math-intensive software at the same time.

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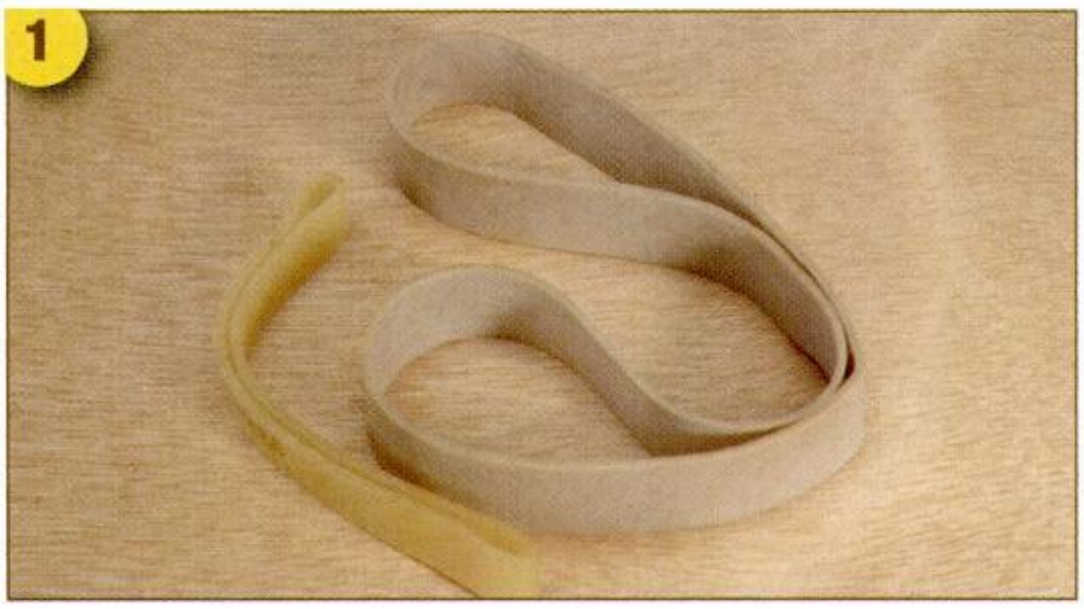
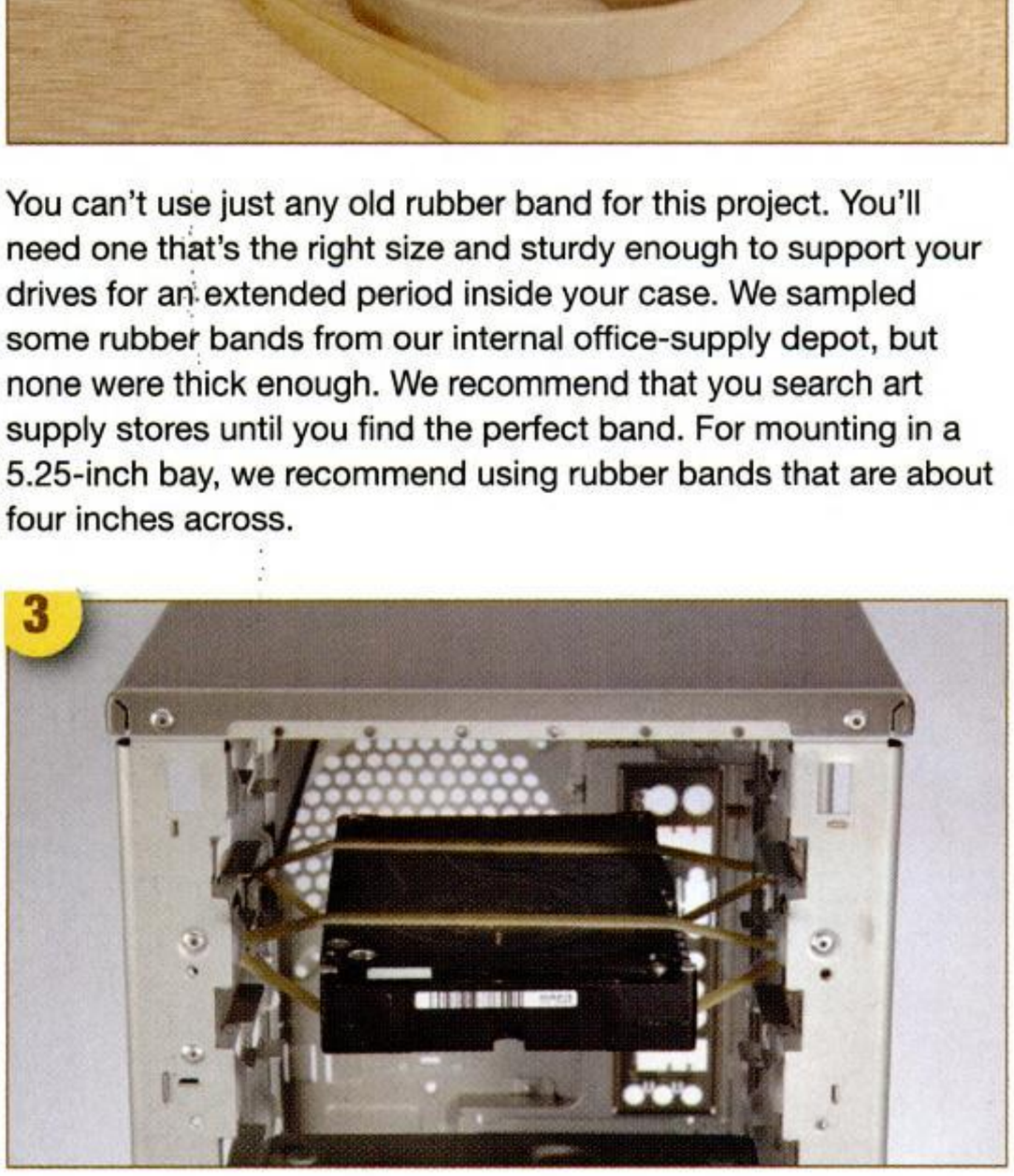
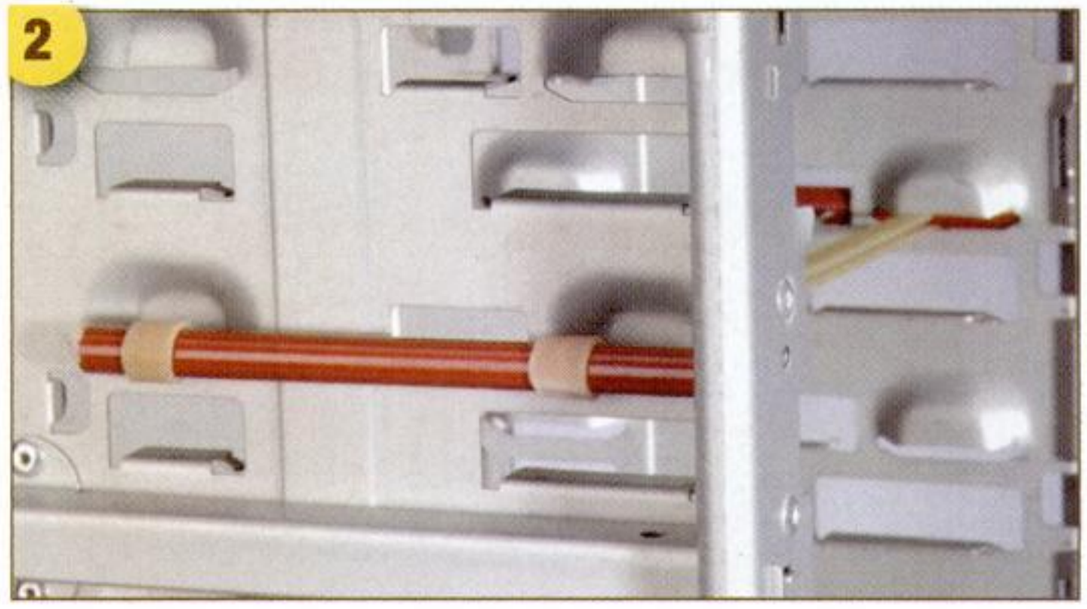
SUSPEND YOUR HARD DRIVES IN RUBBER BANDS

Most cases require you to screw down your hard drives so they are in contact with a metal drive cage. Unfortunately, the rigidity of the metal amplifies every noise made by otherwise quiet drives. By suspending your drives in a web of rubber bands, you can silence your drives completely.



You can't use just any old rubber band for this project. You'll need one that's the right size and sturdy enough to support your drives for an extended period inside your case. We sampled some rubber bands from our internal office-supply depot, but none were thick enough. We recommend that you search art supply stores until you find the perfect band. For mounting in a 5.25-inch bay, we recommend using rubber bands that are about four inches across.





We use pencils to hold the rubber bands in place, so you'll need to cut a couple into three-inch segments. Any pencil-shaped object will do, but pencils work well and are very cheap. The best location to mount your drive is a 5.25-inch drive bay, as it gives the drive plenty of space to float. Thread the rubber band through slots or holes on the side of the bay, and then push your pencil segment through the loops on both sides to secure it. Repeat with a second rubber band toward the front of the case. Make sure the two rubber bands are separated enough that the drive won't wobble.

Once the rubber bands are nice and taut, and secured with pencils, slide your hard drive in between the two loops. If your rubber bands are mounted properly, the drive should float perfectly between them. Once it's installed, wiggle the drive to make sure it doesn't fall out of the bands, and that it doesn't come into contact with metal parts if the case receives a sudden jolt. When you've rebooted your PC, you can test its quietude by defragmenting the drive.

KEEP VOIP CONNECTED

Voice over IP (VOIP) telephony is the hottest thing going these days, but unfortunately, the telephone adapters that power your VOIP service require AC power to operate. That means that when your power goes out, so does your phone. Luckily for you, it's easy to keep your VOIP line running even in a power outage, if you have a battery backup.

You'd typically use a battery backup to keep your PC running during an outage, but it'll also power most any device. If you connect your DSL or cable modem, your router, and your phone adapter to a battery backup, your VOIP line will continue working through a power failure. Because these devices draw very little power compared with a PC, even an inexpensive battery backup will power them for several hours.

HOW TO CLEAN YOUR LCD

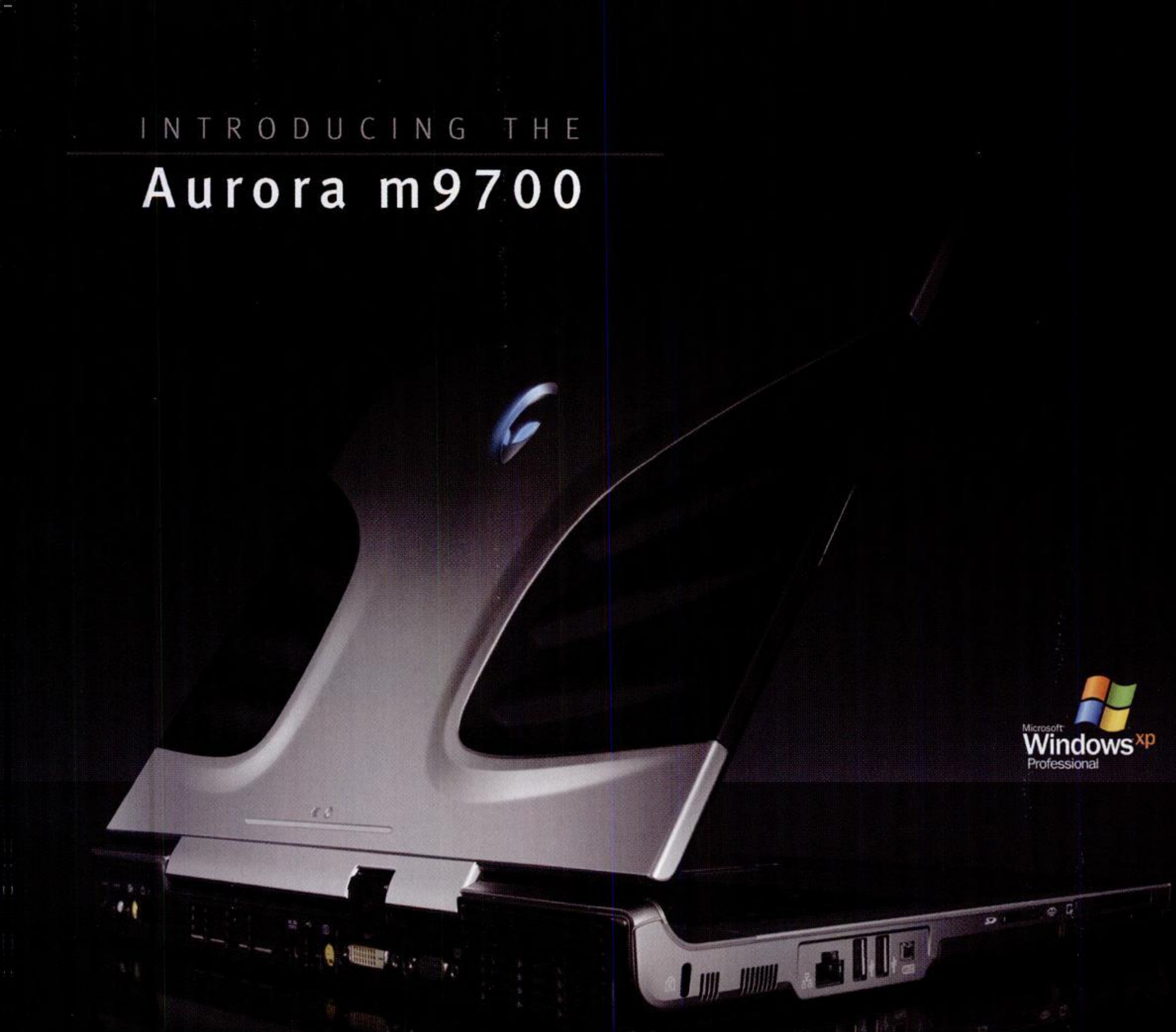
LCD monitors are a delicate species, so proper care is essential to their longevity. There are three issues you should be mindful of: damaging the glass, damaging the antiglare coating, and damaging the surrounding parts.

In the absence of manufacturer recommendations, you should clean your screen with water or 50-percent isopropyl alcohol, using either a lint-free cloth or a paper towel. Oily fingerprints on an antiglare coating are tough to clean, but an ammonia-based cleaner like Windex can do the job. Such solvents could damage or discolor the surrounding plastic parts, however, so never spray the screen directly. Instead spray onto a cloth, and wipe the screen with your moist towel.

Never put any pressure on the glass. Besides the risk of breakage, it changes the optical properties of the panel, usually just temporarily, but permanent damage is possible.

INTRODUCING THE

Aurora m9700



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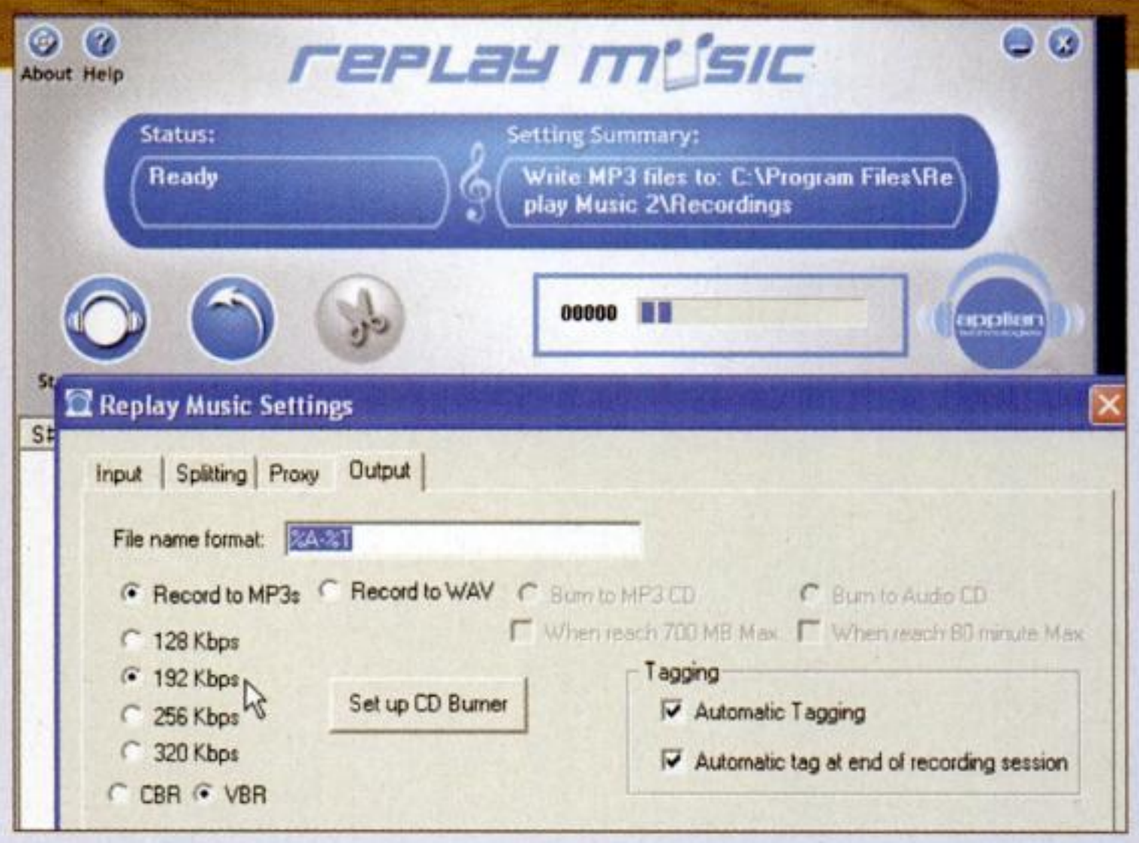
RIP MUSIC FROM ANY SOURCE

ReplayMusic (**www.applian.com**) strips DRM from the music you purchase or rent, so you can listen to it on any player. Click Settings and set Sound Card as your input source on the Input tab. Choose "automatically split tracks" on the Splitting tab, and "record to MP3s" on the Output tab. Choose your bit rate, select both automatic tagging options, and click OK.

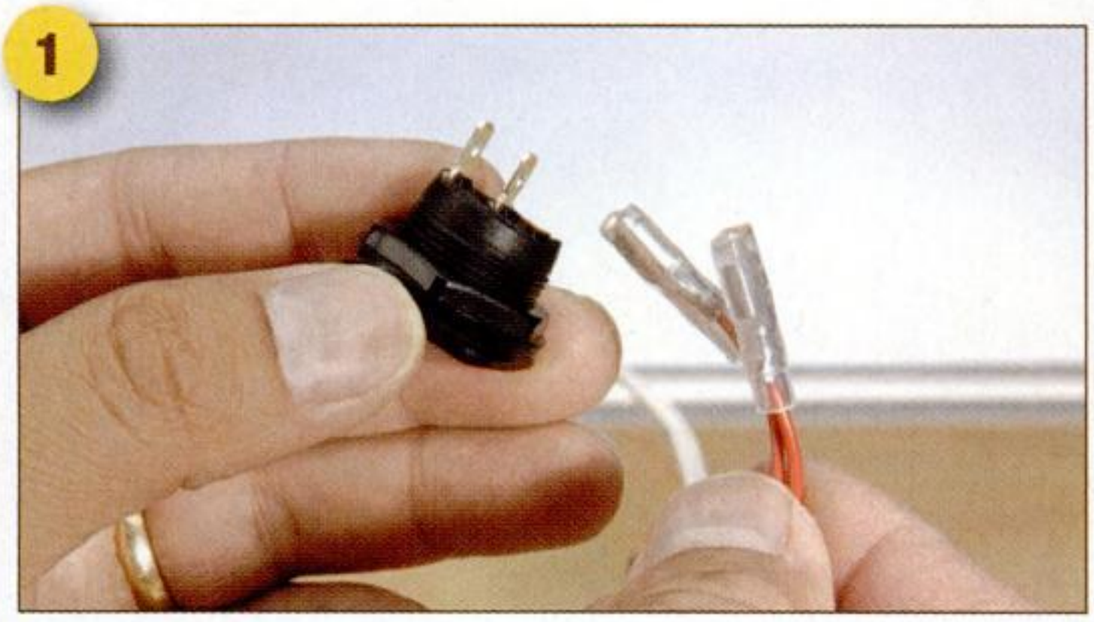
Launch your streaming application and queue up the songs you'd like to record. Go back to *Replay Music,* click Start Recording, and commence streaming. At the end of the queue, *Replay Music* will analyze the tracks, and tag each one with the song title, artist name, album, and genre gleaned from Gracenote.



INSTALL A BAY-MOUNTED CATHODE LIGHT SWITCH

Most cold-cathode lights come with switches that mount behind your PC, in an empty PCI slot. Those switches are easy, but inconvenient, so we're going to show you how to add a light switch to an empty 5.25-inch drive bay. All you need is a round, two-pin switch, a ¾-inch drill bit, and about 10 minutes. We got our hardware at FrozenCPU (**www.frozencpu.com**).

1



If your cold-cathode doesn't include a round switch, you'll have to buy one. They're usually available online or at Radio Shack and other electronics stores. Once you have the appropriate switch, identify the two cables that connect to the current switch. If you can, simply pull them off their connector and attach them to the round switch. If you must cut them, you can attach new female crimp-on quick disconnects (Radio Shack part #: 64-3039) to the leads.

2

Now we're going to drill the hole. We went to the store and bought a 3/4-inch drill bit, because that's the diameter of the switch. To ensure that the hole is centered, you should measure from the top and bottom of the bay cover. Use a smaller drill bit to create a pilot hole, then drill slowly with the 3/4-inch bit to make a switch-size hole. The big bit will bite hard on the plastic, so it's best to use a vise to hold the bay cover steady during drilling. After you've drilled the hole, you'll need to clean it up a bit with a file or some sandpaper.

3

If the hole is the proper size, the switch should drop right into it. Switches are secured either by flanges on their edges (like this one), or they are threaded and secured with a nut. Either type will work. Once you secure the switch to the drive-bay cover, attach the two cables from the lights and you're all done.

CAUTION!
When using a drill, always wear eye protection, and do not drill on top of a table as shown in this image!

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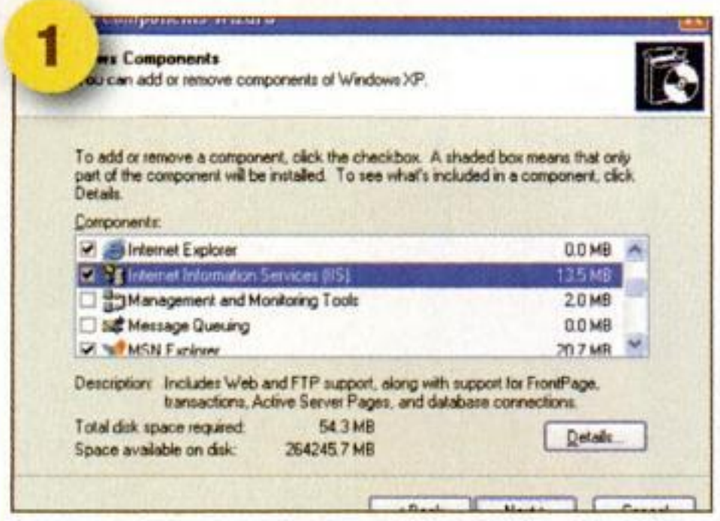
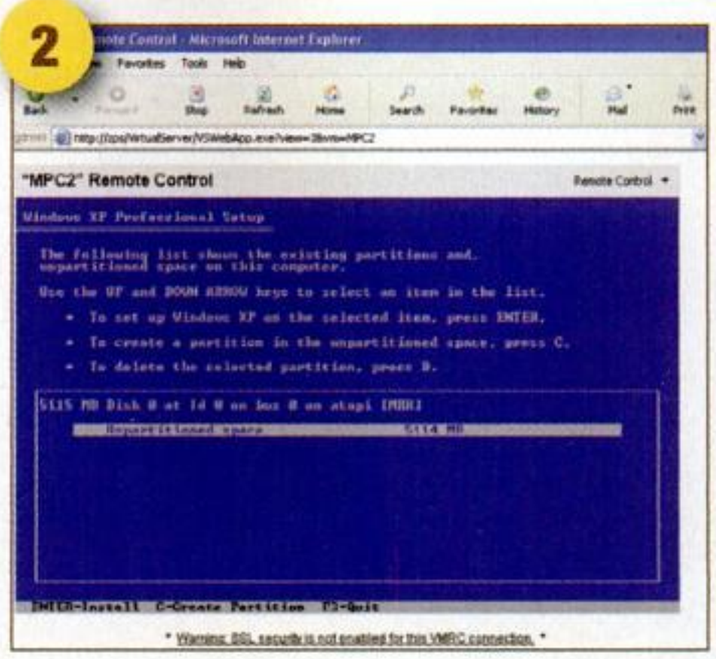
USE VIRTUAL SERVER 2005 TO BUILD A BULLETPROOF TEST ENVIRONMENT

1


Components
To add or remove a component, click the checkbox. A shaded box means that only part of the component will be installed. To see what's included in a component, click Details.
Components:
Internet Explorer 0.0 MB
Internet Information Services (IIS) 13.5 MB
Management and Monitoring Tools 2.0 MB
Message Queuing 0.0 MB
MSN Explorer 20.7 MB
Description: Includes Web and FTP support, along with support for FrontPage, transactions, Active Server Pages, and database connections.
Total disk space required: 54.3 MB
Space available on disk: 264245.7 MB
Details...

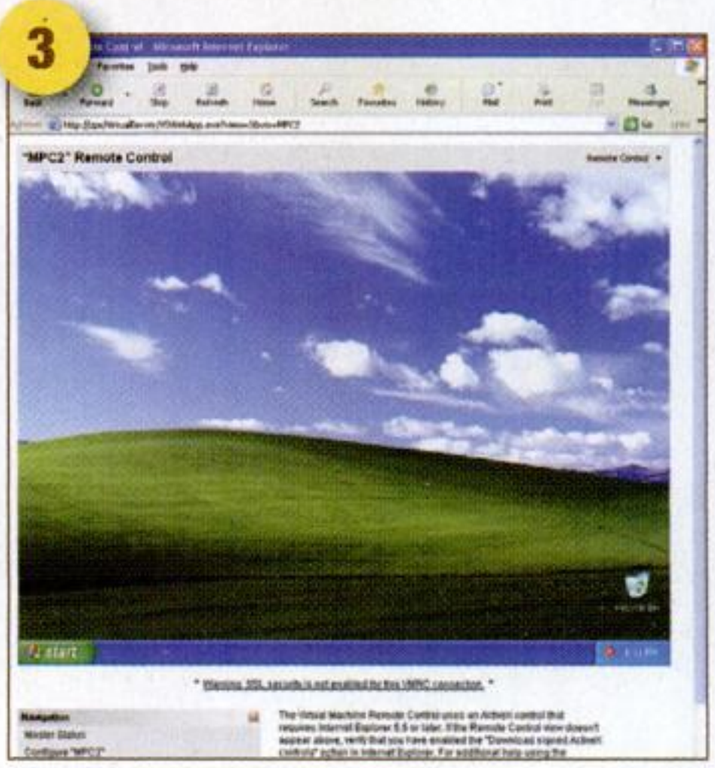
By testing questionable software inside a virtual machine in Windows, you ensure that naughty apps won't contaminate your rig with malware. There's easier virtualization software out there to use, but none as cheap as Microsoft's free *Virtual Server 2005* (**www.microsoft.com/virtualserver**). Before you can run *Virtual Server RC2*, you'll need to install *IIS* on your XP Pro machine. To do this, go to Control Panel, then Add or Remove Programs, and click Add/Remove Windows Components. Check *IIS* and click install. Installing *IIS* on a machine that's exposed to the Internet is risky, so make sure to disable *IIS's* access to the network using your firewall. Alternately, you could use either *Virtual PC 2004* or *Vmware Workstation 5.5*.

2


"MPC2" Remote Control
Remote Control
Windows XP Professional Setup
The following list shows the existing partitions and unpartitioned space on this computer.
Use the UP and DOWN ARROW keys to select an item in the list.
* To set up Windows XP on the selected item, press ENTER.
* To create a partition in the unpartitioned space, press C.
* To delete the selected partition, press D.
ENTER=Install C=Create Partition F3=Quit
* Warning: SSL security is not enabled for this VNRC connection. *

To create a virtual machine, start *Virtual Server.* Under virtual machine, click Create. Give your VM a name, set the amount of RAM you'd like the virtual machine to use (we recommend about one-quarter of your overall system RAM), and how much space to allocate for the virtual hard drive (5GB should cover a standard Windows XP install). Click Create and click the small thumbnail that appears. Click it again to expand the window and you'll see a familiar prompt asking you to insert a boot disk. Insert your Windows XP Pro disk into the drive and install Windows.

3



Once you have your machine created, you should install the latest patches for the OS and take the normal security measures that you would with a fresh Windows install. When you've patched and secured the OS, you should make a backup of the file containing your virtual machine. It's stored in a subfolder of the Shared Documents folder (just grab all the contents of the C:/Documents and Settings/All Users/Shared Documents/Virtual Server/ Folder). When you need to test a questionable app, fire up the virtual machine, install it there, and then scan the drive for potential problems. If the VM gets infected, ditch the app, and restore your virtual machine to its pristine state—it's as easy as replacing the file with the one you backed up.

INCREASE YOUR WIRELESS ROUTER'S RANGE

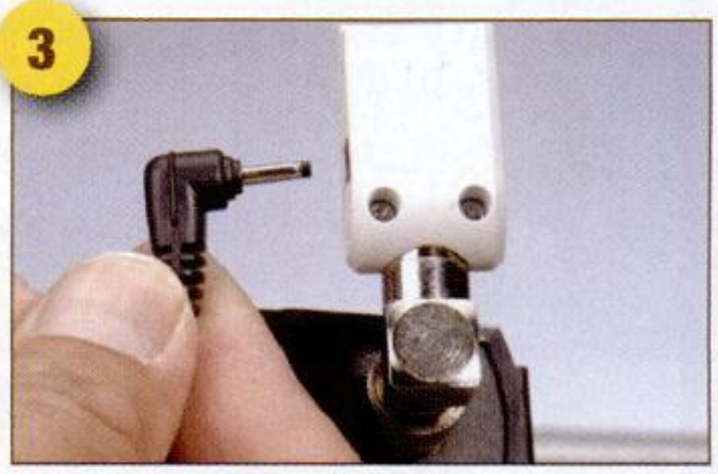
1

If you're tired of reaching the end of your wireless router's electronic leash, either because you live in a mansion or because there are just too many floors and walls in between your router and your laptop, boost its transmission power with a more powerful antenna. Disconnect the router's power supply and remove its existing antenna by twisting its collar clockwise.

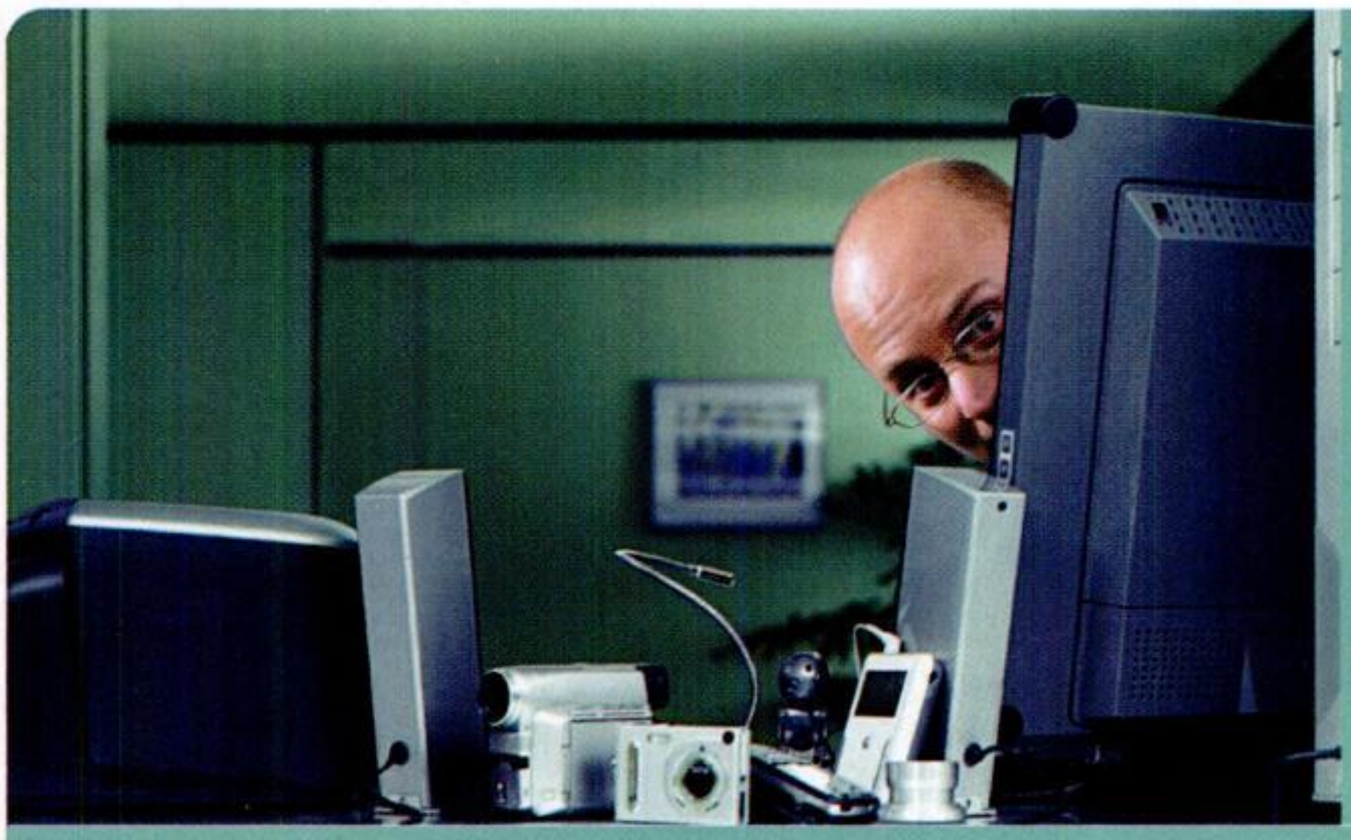
2

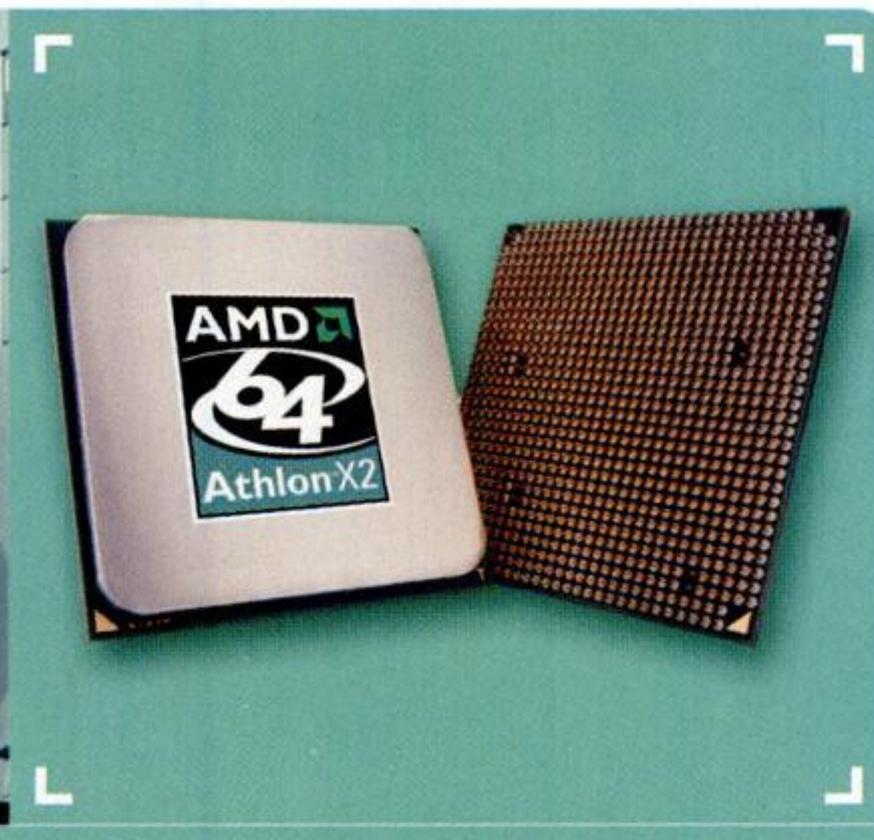
We chose Radio Labs' WRE500MW for this task because the manufacturer claims it can increase a wireless access point's range by a factor of 30. (Note: This won't work with draft 802.11n spec routers, because the MIMO technology they use requires uniform antennae.) Secure the new antenna to the wireless access point by twisting its collar counterclockwise. Take care to align the threads so you don't strip them.

3



The WRE500MW achieves its impressive range in part because it has its own power supply. Plug the power supply into your outlet strip and plug the connector to the signal amplifier. Plug your router's power supply back in. The final step is to see how much further you can wander with your laptop!





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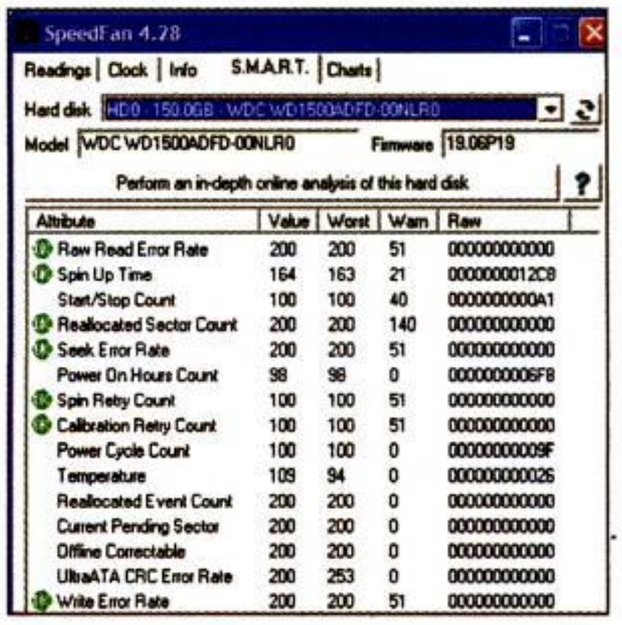
MONITOR YOUR HARD DRIVE WITH SMART

SMART stands for Self-Monitoring and Reporting Technology, a technology built into all hard drives to help predict failures. Most motherboards have this feature turned off by default, though. We'll show you how to turn it on and see the information it's reporting.

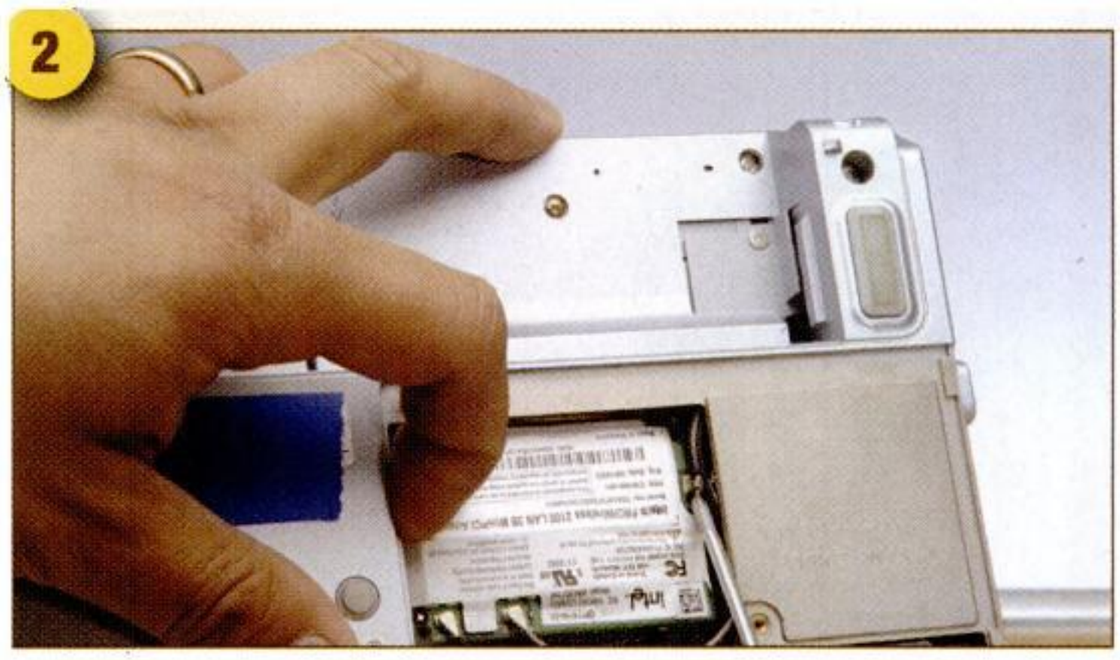
The first thing you need to do is enable SMART in the BIOS. Navigate through your BIOS until you find the SMART setting. It's usually labeled Hard Disk SMART or something similar. Enable it, save your changes, and reboot the PC. Now your drive will monitor itself, and if there's a problem your PC will let you know during the boot process. If you see this message, back up the drive immediately, but don't shut down the system—the drive might not survive a shutdown.

If you want to see the information the drive reports, download *Speedfan* (**www.almico.com/speedfan.php**). Fire up the utility, click the SMART tab, and select which drive you'd like to examine. It'll show you all the information returned by the drive, as well as the drive's self-described "fitness" and "performance." A warning in any of these categories means the drive could be singing its swan song.

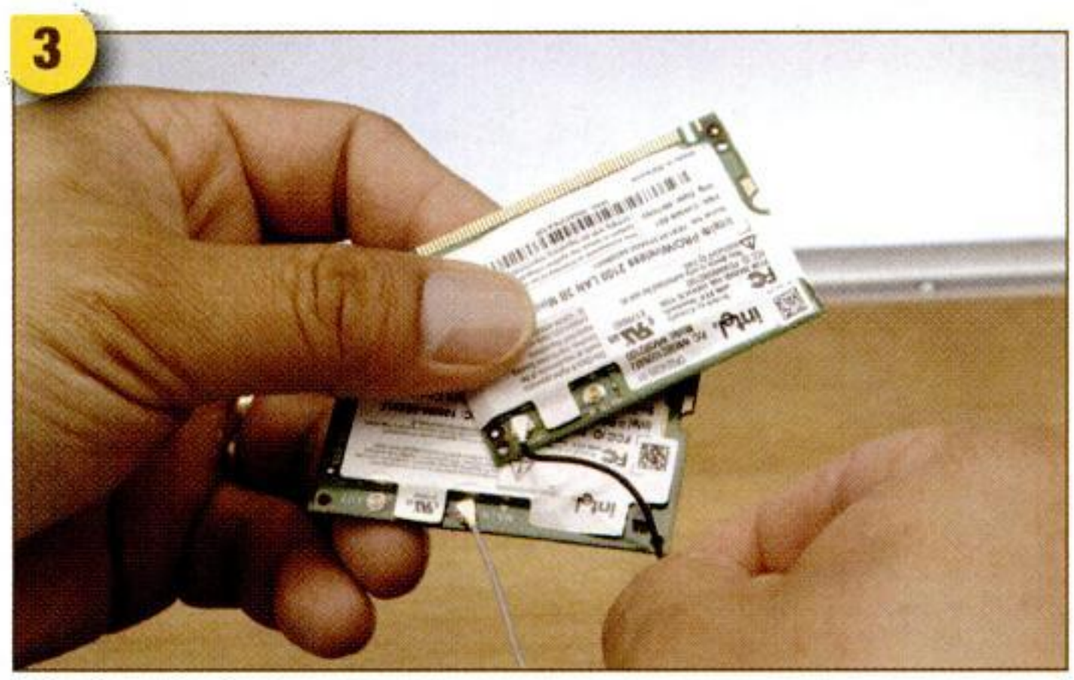

SpeedFan 4.28
Readings | Clock | Info | S.M.A.R.T. | Charts |
Hard disk HD0: 150.0GB - WDC WD1500ADFD-00NLR0
Model WDC WD1500ADFD-00NLR0 Firmware 19.06P19
Perform an in-depth online analysis of this hard disk
Attribute | Value | Worst | Warn | Raw
Raw Read Error Rate | 200 | 200 | 51 | 000000000000
Spin Up Time | 164 | 163 | 21 | 0000000012C8
Start/Stop Count | 100 | 100 | 40 | 0000000000A1
Reallocated Sector Count | 200 | 200 | 140 | 000000000000
Seek Error Rate | 200 | 200 | 51 | 000000000000
Power On Hours Count | 98 | 98 | 0 | 0000000006F8
Spin Retry Count | 100 | 100 | 51 | 000000000000
Calibration Retry Count | 100 | 100 | 51 | 000000000000
Power Cycle Count | 100 | 100 | 0 | 00000000009F
Temperature | 109 | 94 | 0 | 000000000026
Reallocated Event Count | 200 | 200 | 0 | 000000000000
Current Pending Sector | 200 | 200 | 0 | 000000000000
Offline Correctable | 200 | 200 | 0 | 000000000000
UltraATA CRC Error Rate | 200 | 253 | 0 | 000000000000
Write Error Rate | 200 | 200 | 51 | 000000000000

UPGRADE YOUR NOTEBOOK'S WI-FI

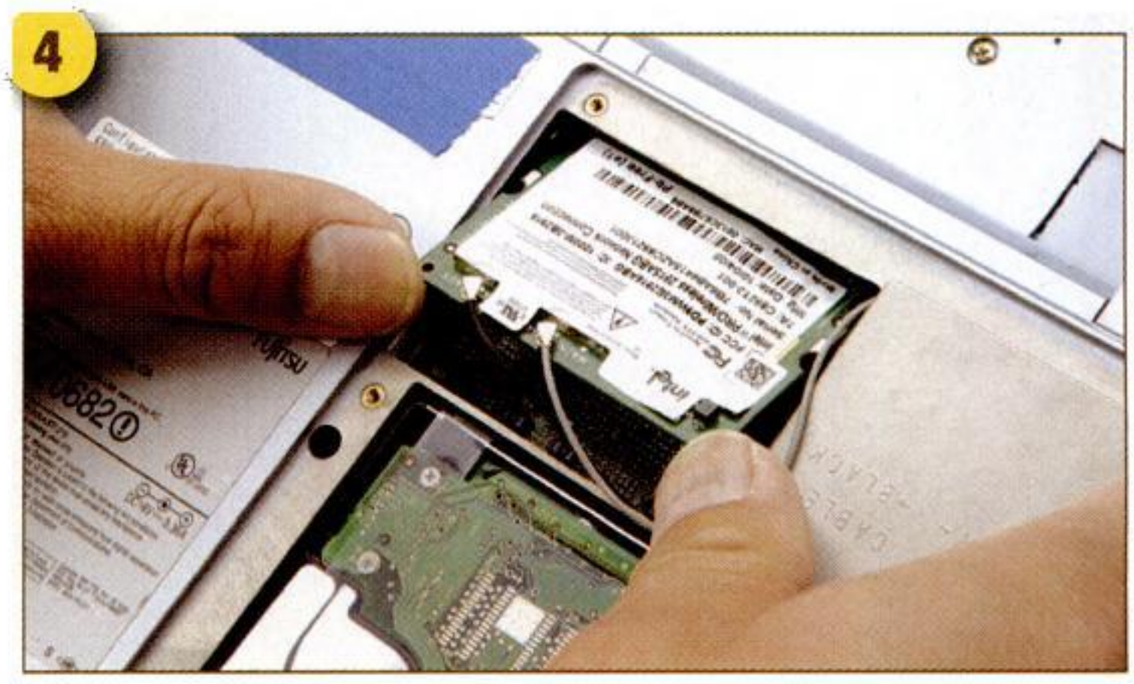
Because Mini PCI Express cards are almost always compliant with the latest Wi-Fi specs, we're only showing you how to upgrade older Mini PCI-powered 802.11b notebooks to 802.11g and 802.11a standards. First, power down your notebook and remove the battery. Then remove the access plate covering the Mini PCI slot. Put the screws in a cup or container so you don't lose them.



Use a screwdriver to release the arms that hold the card in place. When the arms are clear of the card, the card should spring up at an angle. Be careful not to disconnect the antenna leads. You'll want to leave the wires in place, so you can attach them to the new card in the next step.



You can now remove the card from the slot. To keep the antenna wires from getting mixed up, you should place the new card next to the old card and connect the antennas to the new card, one at a time.



Insert the new card into the slot at a 45-degree angle until the edge connectors are just barely visible and carefully tilt the card back down until the retention arms lock it into place. Boot your notebook, install your drives, and you're ready to go!

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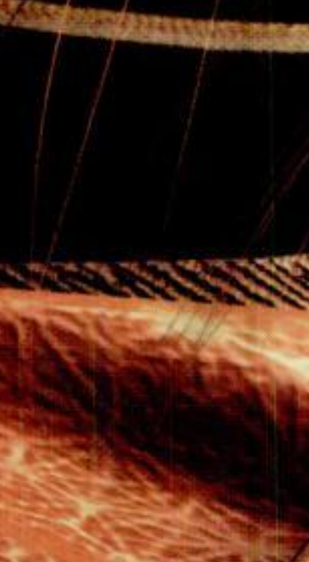

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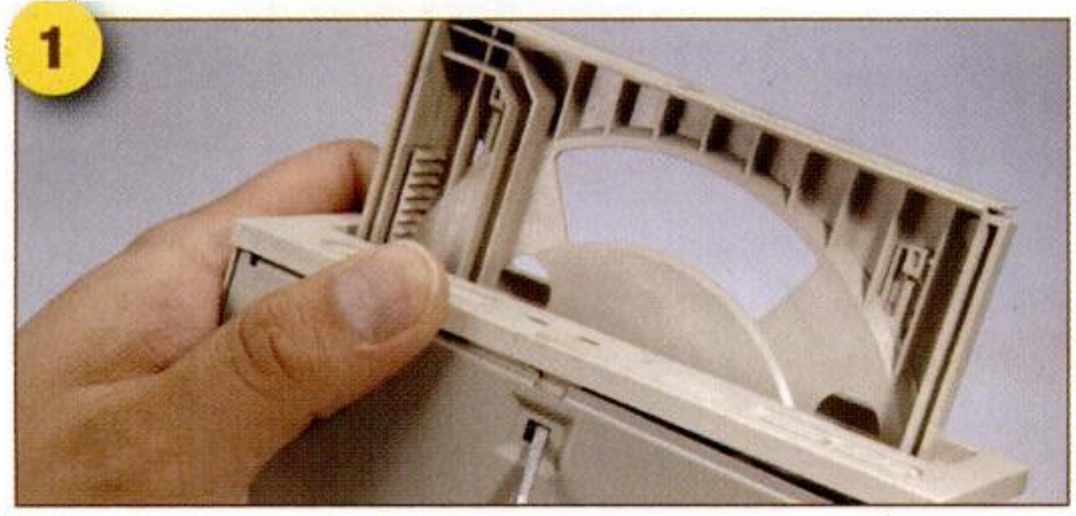
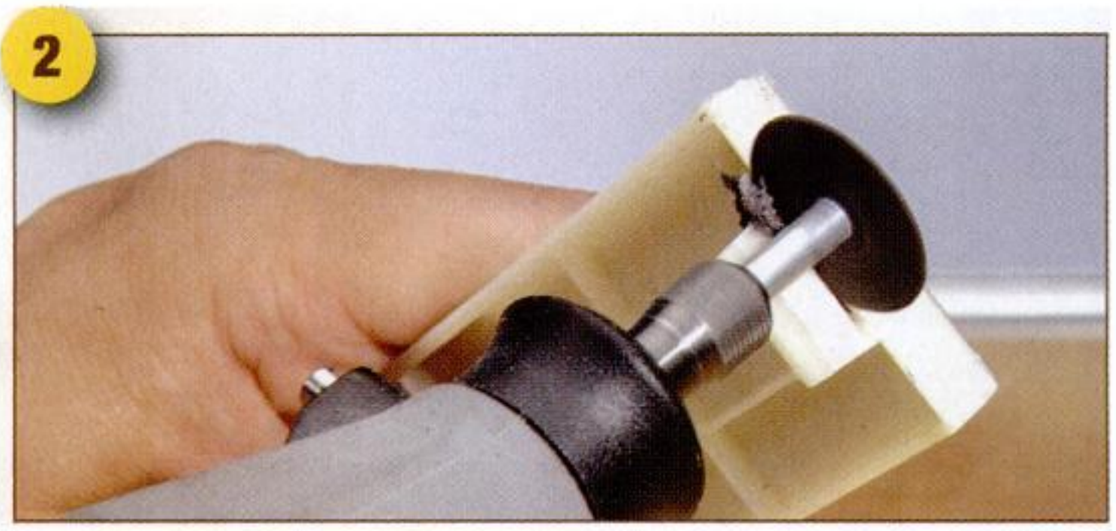
CREATE A CAMOUFLAGED OPTICAL DRIVE COVER

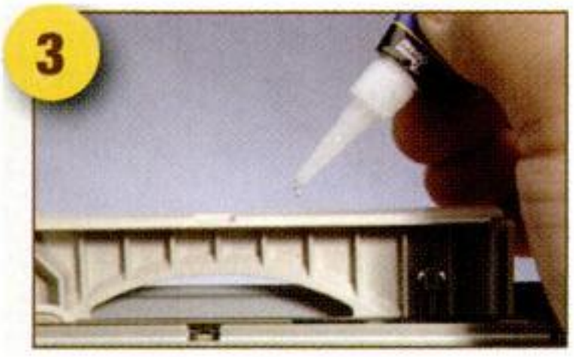
A beige optical drive in a silver or black case sticks out like a sore thumb. Here's how to attach one of your drive bay covers to the optical tray for a much cleaner look.



First, you'll need to remove your old bezel and tray covers from your optical drive. Eject the optical drive tray a smidge by poking a paper clip into the eject hole. Next, grab a small, flat-head screwdriver and depress the tabs that hold the bezel cover onto your drive chassis. Then pry the bezel off of the chassis. Finally, grab the cover on the optical tray itself and carefully slide it down and off the tray.



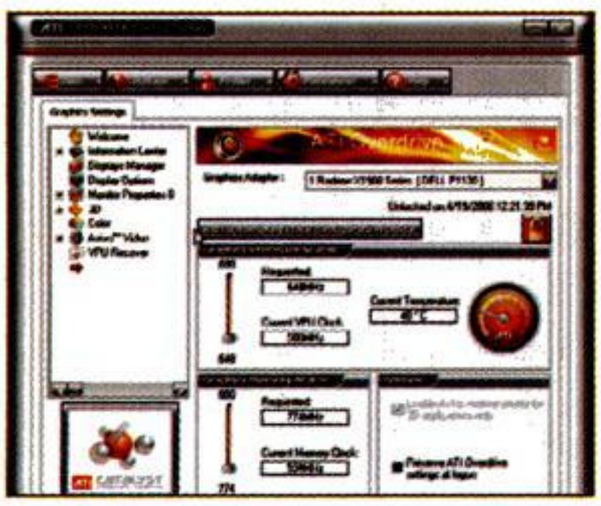
Next, you'll need to modify the bezel cover so it fits into the case. It's easier if you have plastic bezel covers, but it will also work if you have metal. Shave off any tabs that would lock the bezel in place, and cut anywhere you need to so the bezel cover will be able to retract into the case without getting hung up on the case.



To mount the bezel on the drive, you'll want to slide the drive into the case. Eject the optical tray partially, and apply your crazy glue, epoxy, or rubber cement to the front of the tray. Then align the bezel with the tray—taking care to make sure the bezel will line up with the hole in the case—and mount the bezel to the drive tray. Let it sit long enough to create a strong bond. When the glue sets, screw the drive into your system and you're done!

The only downside to our optical drive cover is that it blocks your eject button. In order to open your drive, you'll have to right-click it in My Computer and click Eject (alternately, you can use the EjectMe! Widget for Yahoo Widgets), but that's a small price to pay for such an exquisite look.

AUTOMATICALLY OVERCLOCK YOUR ATI GPU



ATI makes overclocking *some* of its GPUs ridiculously easy. If you're running a model that ATI believes can tolerate a higher frequency, simply launch the Catalyst Control Center (using the Advanced option) and click the Unlock icon to activate the company's Overdrive utility. Although ATI officially warns that it won't be responsible for problems occurring as a result of using OverDrive, using it has no impact on your warranty.

Click the button labeled "Run automated clock configuration utility" and the software will sequentially step up the clock speeds on the memory and GPU to the maximum values the components can tolerate. Place a checkmark next to "Preserve ATI Overdrive settings at logon," so that the settings stick after a reboot.

AUTOMATICALLY OVERCLOCK YOUR NVIDIA GPU

nVidia's *Coolbits* overclocking tool is very powerful and can damage your GPU if used carelessly. It will also void your warranty—you've been warned.

First, you'll need to enable *Coolbits*. Click the Start menu, choose Run, type regedit, and click OK. Scroll down the left-hand window to the item labeled "HKEY_LOCAL_MACHINE\SOFTWARE\NVIDIA Corporation\Global\NVTweak." Click the + button and select NVTweak. Right-click the right-hand menu and choose "New DWORD value." Name this Coolbits and change its value to either 3 (for a single card) or 1A (for SLI). Exit the Registry, open the Display Control Panel, and choose Clock Frequency Settings. Click Detect Optimal Frequencies to have Coolbits automatically increase core and memory clock speeds; alternatively, you can select specific values using the sliders, testing each for stability at each step.

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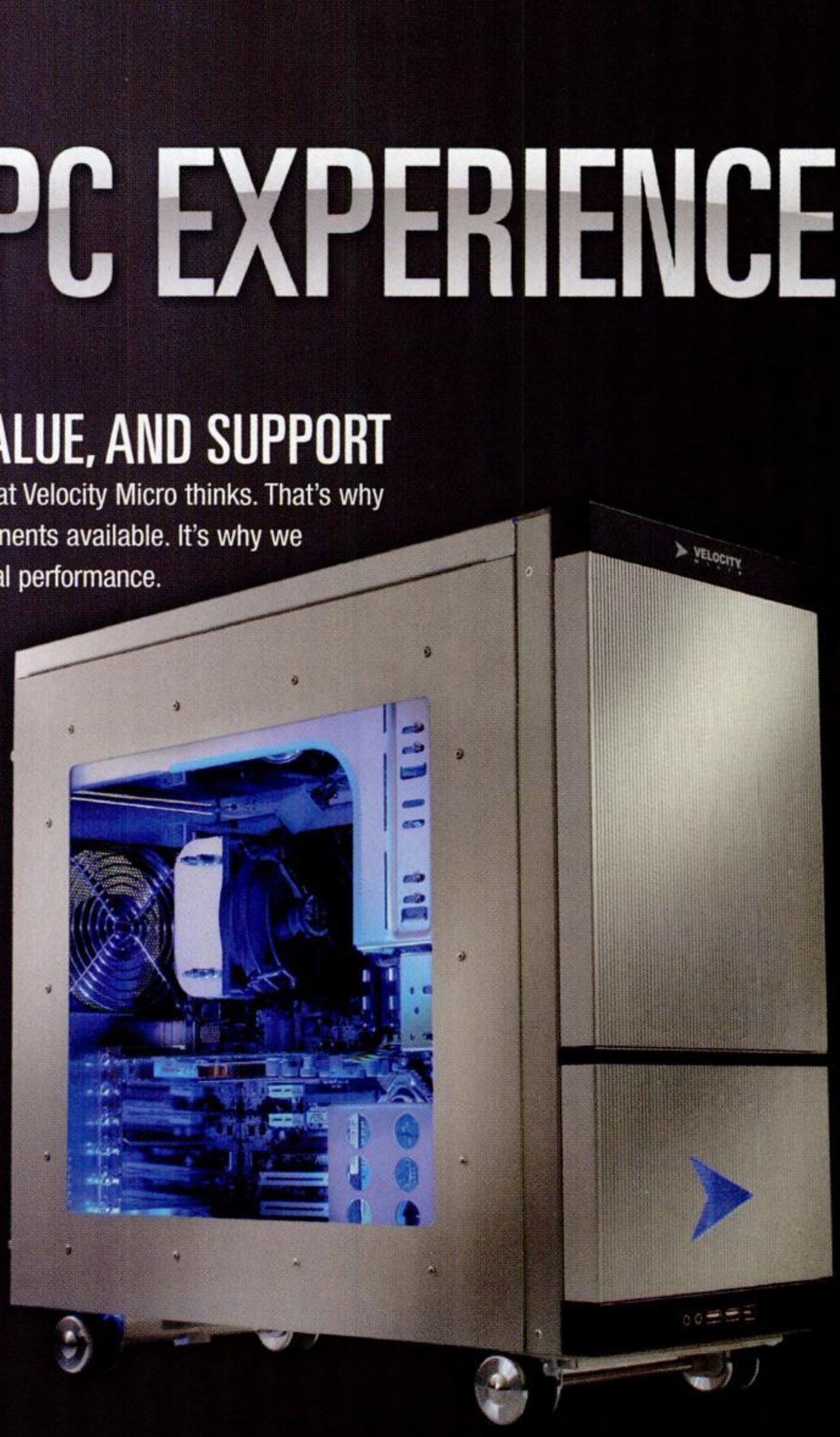

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MAKE YOUR OWN KICK-ASS AIR FILTER

Lots of high-end cases come with handy-dandy air filters these days, but if your case doesn't, it's easy to add one. There are a ton of disposable dust rags in the cleaning aisle of your supermarket, and they make great air filters for a PC. We've used both Swiffer Dry Sweeping Cloths and Grab-It dusting cloths with success. Just trim one of these cloths to completely cover the hole over your fan intake. These filters are dust magnets, and will pull a ton of filth from the air before it can contaminate your sensitive components.

1

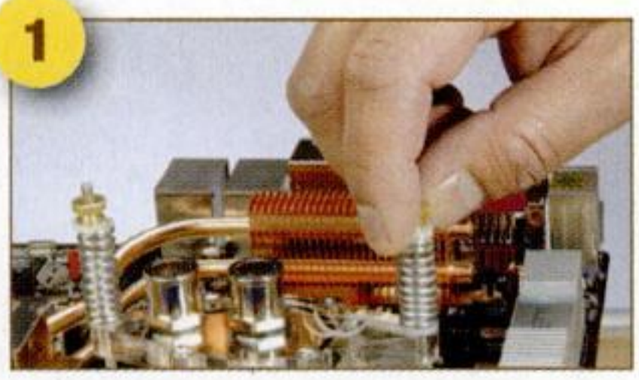
Our test case came with a filter, but we're replacing it with a Swiffer. If your case doesn't have a fan-mounting mechanism like this one, just tape the cloth over the hole with a few pieces of masking tape. It works just as well, and you'll immediately notice a difference in the cleanliness of your case. Make sure you replace the filter every few months; a homemade filter clogs much more quickly than a traditional one, and can adversely impact airflow in your case.

2

ASSEMBLE A WATER-COOLING KIT

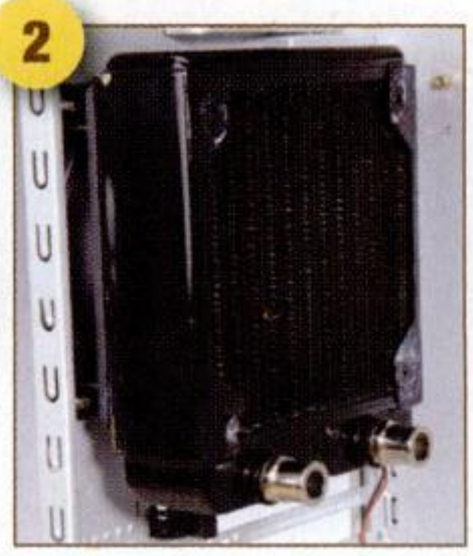
Though all water-cooling kits use slightly different components, they require the same steps to build. We got a DIY kit from **www.dangerden.com** to show you how easy it can be.

1



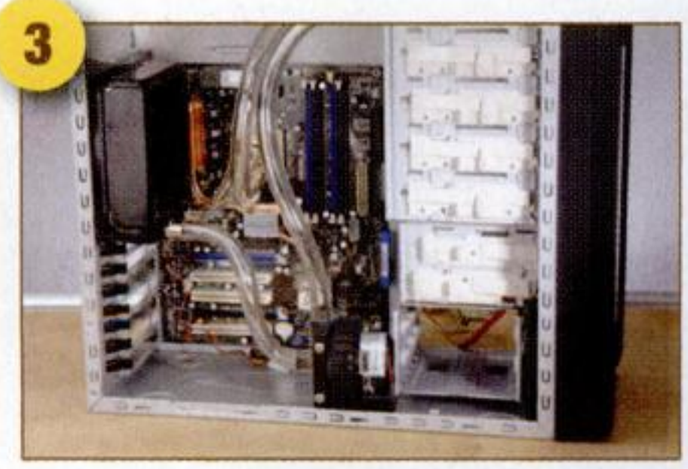
You'll want to mount your cooling blocks before you attach tubing. The tubing will yank the block around and make it difficult to secure. So, attach all of the necessary water blocks to your components. If your blocks require adapter fittings, make sure the fittings are as tight as possible to prevent leaks down the road.

2



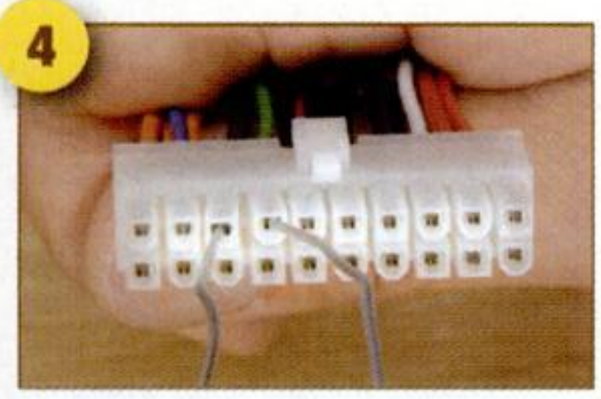
Next you'll need to mount the radiator, pump, and reservoir. Most kits use an external radiator because it's difficult to cram one inside a case. The radiator will always take the place of an internal case fan—we usually replace the rear exhaust fan. Once you remove the fan, you mount the radiator/fan assembly in its place with four screws. The reservoir should slot into a 5.25-inch bay, and you'll stick the pump on the case floor.

3



Once all the parts are in their proper locations, you'll be able to measure how much tubing you need to connect the components. Cut the tubing to size, but be sure to leave at least three or four inches of slack. We recommend you configure the water to flow in this order: Pump outlet to radiator inlet, then radiator outlet to first block inlet, then block outlet to reservoir inlet, then reservoir outlet to pump inlet. Connect the tubing and secure it to the blocks using the hardware provided with your kit. If the tubing won't fit over the barb, dip the end of the tube in boiling water for 15 seconds to soften it.

4

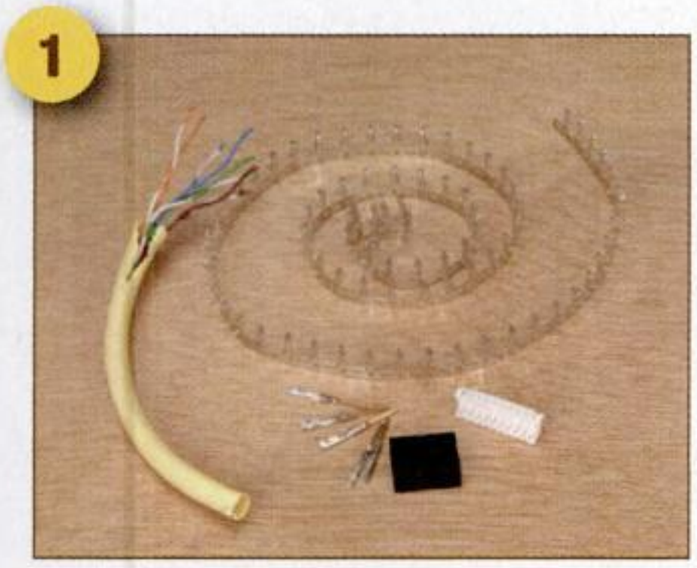


Performing a test-run achieves two goals: It lets you know if there are any leaks, and it allows the circuit to fill completely with water before it actually has to cool anything. First, fill the reservoir as full as you can. Next, make sure the power supply is unplugged. We're going to rig the PSU to send power to the pump without turning on the computer. You can hotwire a PSU by plugging a paper clip into holes number three and four (the wires are green and black, respectively) on the first row of the ATX power plug. Attach the necessary power cable to the pump. Plug in the PSU, and water should start flowing through your circuit. Keep adding distilled water to the reservoir (as needed) until your loop is completely full. Then turn off your power supply and let it sit for an hour or two to check for leaks and to allow any air bubbles to make their way to the top of the system.

5 If your circuit is not leaking and there are no visible air bubbles, it's time to fire up that baby! Take the paper clip out of the PSU connector and connect it to the motherboard. Turn on your PC and check the temperature for the CPU/GPU. For CPUs, we prefer *Speedfan*. For the GPU, both ATI and nVidia have temperature settings in the card's control panel.

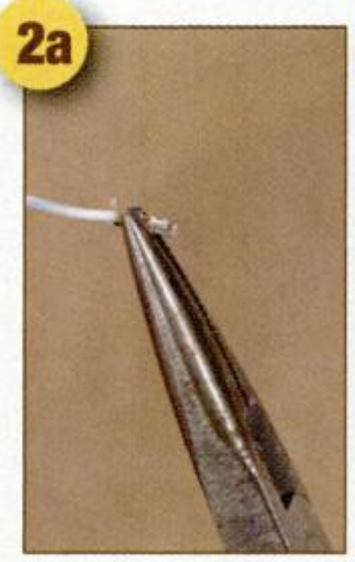
PLUG YOUR X-FI INTO THE FRONT-PANEL CONNECTORS ON YOUR CASE

After seeing Velocity Micro's front-panel adapter for Creative Labs' X-Fi cards, we decided we had to build our own. But where do you get the parts? While searching for parts, we discovered Melechric's **http://audigy2zshowto.blogspot.com** site, and saw that he'd already done the legwork with the old Audigy 2 ZS. The harness happens to be the same for the X-Fi but we made a few modifications to actually pattern ours after Velocity Micro's design.

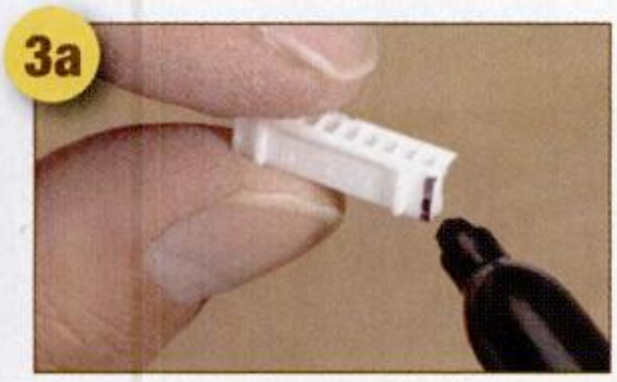


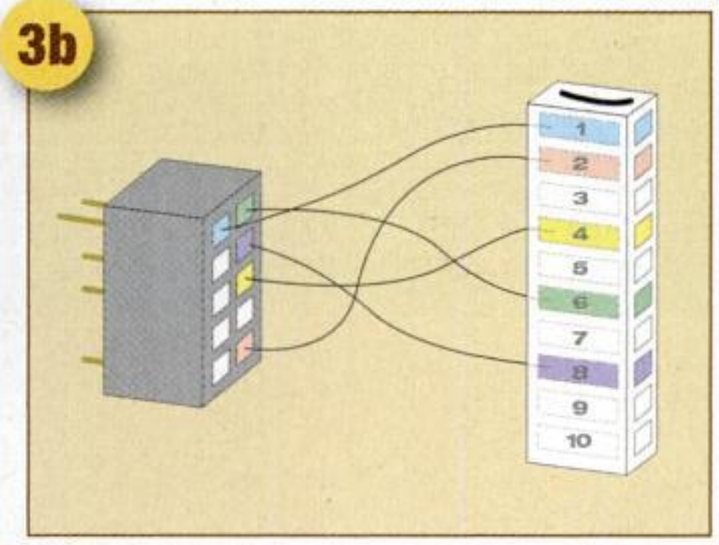
First you'll need to collect your parts. We purchased the white 10-position, 2mm connector (part no. 455-1151-ND) that snaps into the soundcard's front panel connector, from Digikey.com. The small terminal connectors that hook into the 10 position connector are part No. 455-1127-1-ND. We also bought black connector housings (WM2522-ND) that will be used to hook into the case's front panel audio connectors, and large terminal connectors that will go into the black housing block (part no. WM2515-ND). You should also grab an old Ethernet cable to use for wire.

You'll also need small needle-nose pliers and a good set of wire cutters. How many parts do you need? The absolute minimum is one white 10 position connector, one black housing block, and five of each terminal connector. That's assuming you won't make any mistakes building the harness. We recommend that you buy plenty of extra parts, just in case.

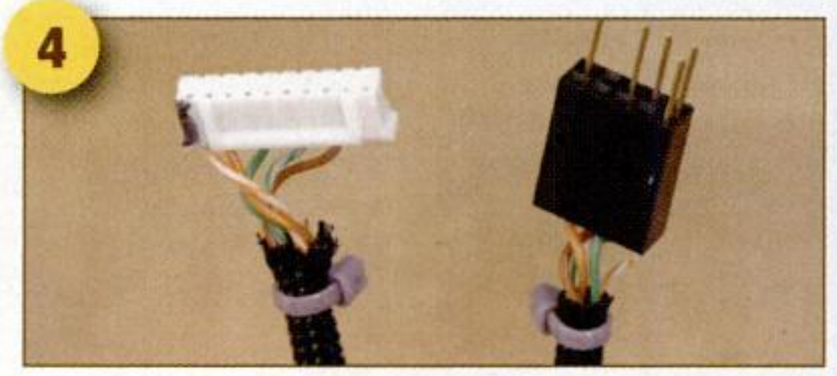


Cut a five-inch section of network cable and separate the individual stands. You'll need a total of five wires for this project. Strip 2mm of insulation from each end of the individual wires. Carefully crimp a small connector to one side and a large connector to the other side of each wire. Repeat until you've made five wires.





Position the white 10-position connector so the two tabs are facing you. Take a Sharpie and mark one corner. This will be position 1. Starting from position 1, insert a wire using the small connector side. The wire should fit only one way without needing to be forced and the small metal tab on the connector should lock into a plastic tab when you insert it far enough. Counting from position 1, you'll want to insert wires into positions 1, 2, 4, 6, and 8 (refer to image 3b). The rest should remain empty. Position 1 is ground, 2 is the headphone left output, 4 is the headphone right output, 6 is the MIC input, and 8 is the voltage for the microphone.



If your case uses a front-panel audio connector that's individually wired, you should be able to match the left/right, mic, ground, and mic power wires to your case and plug each one in individually. Make sure, however, that each wire is insulated from the others, a short can damage your soundcard. A small bit of electrical tape or even Scotch tape will do the trick. We actually went a little further and inserted the longer connectors into the black housing block and sheathed the harness in a mesh sleeve.

HOW TO DISPOSE OF WATER-COOLING LIQUID

Most water-cooling kits include an anti-algae formula that's part glycol—a toxic substance. If you use it, you cannot simply pour the liquid down the drain when performing a system flush. Instead, you must call the local fire department and ask about the county's hazardous waste disposal policy. In San Francisco, we have to take used coolant to the local trash disposal site. A safe and sound alternative is to use a non-toxic coolant, such as Fluid XP or Danger Den's MCT-5/MCT-40, which you can just pour down the drain.

AND THAT'S A WRAP!

OK, that's it for this year's DIY spectacular! We're always on the lookout for more great how-to stories, though; so if you've got a how-to or DIY project that you'd like to see in *Maximum PC*, send it our way! The email address is **input@maximumpc.com**. MPC

Performance

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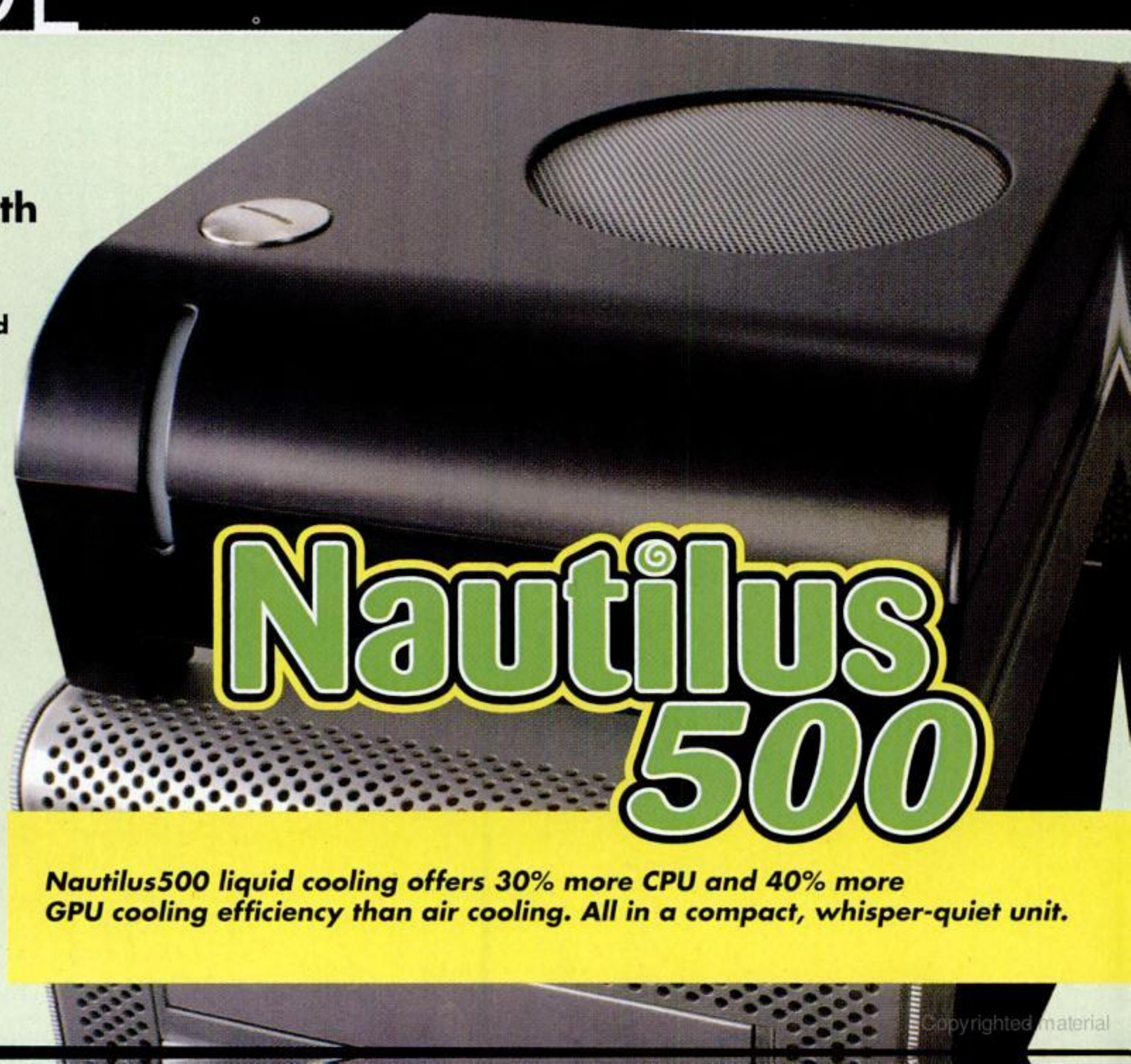
Liquid-cool components with Corsair Nautilus500

Efficient cooling preserves the integrity and extends the life of your system's key components. But if you're tweaking the last ounce out of an overclocked processor, reliable cooling is a must.

The award-winning Corsair Nautilus500 Liquid Cooling Unit dissipates up to 500W of heat. It can cool your processor, 2 SLI video cards and the north bridge in one closed loop without ever reaching its rated specification! The result: maximum performance with minimal stress on your system.

And we've made advanced technology user-friendly. Nautilus500 features modular, snap-and-play design that keeps set-up quick, easy and foolproof.



Nautilus500 liquid cooling offers 30% more CPU and 40% more GPU cooling efficiency than air cooling. All in a compact, whisper-quiet unit.

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A Tale of TWO MUSIC TECHNOLOGIES

Internet music services offer cheaper, more-convenient access to your music, compared with compact discs, but pitfalls abound. We evaluate eight of the biggest online music services, and ask the question: Are any of these services better than CDs?

BY MICHAEL BROWN

Apologies to Dickens, but when it comes to music, this is the best of times, and this is the worst of times. Technology and competition have drastically reduced costs to consumers, but they've also introduced a raft of problems, ranging from half-baked DRM schemes to incompatible file formats.

Wrangle with hassles like these long enough and you might find yourself pining for the reassuring simplicity of the compact disc. After all, you can drop one of those silver puppies into any hi-fi system, car stereo, or computer and have pristine audio pouring into your skull in seconds. There's no need to worry about file formats, sample rates, or—for the most part—problematic copy protection. The technology is absolutely plug-and-play, and you can rip even "protected" CDs to any audio format and quality level as many times as you'd like.

From an economic perspective, on the other hand, online music can be much cheaper than buying CDs. Rhapsody and Napster, for instance, operate on a subscription basis: For the price of one CD per month, you gain nearly unlimited access to hundreds of thousands of songs. Others, such as MusicGiants and Apple's iTunes, operate on more of a pay-as-you-go basis: There are no monthly fees, but you pay for each track you download.

But which service is best? Which has the deepest catalog? What kinds of problems can DRM cause? Which service delivers the best-sounding downloads? Does signing up with one preclude you from using the others? Does owning an iPod limit you to iTunes? We put eMusic, iTunes, MusicGiants, MusicMatch on Demand, Napster, Rhapsody, Virgin Digital, and Yahoo Music Unlimited to the test to answer these and other questions.

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A Tale of Two Music Technologies

Rhapsody

Real Networks' Rhapsody offers three subscription models, including a free one that limits you to streaming 25 tracks each month from the service's library of 1.6 million songs (at 128Kb/s WMA). You also gain access to 25 ad-free Internet radio stations. Songs can be purchased for $1 each; complete albums average $10 each (subscribers get a 10-percent discount). Purchased music is encoded in either AAC or RealAudio 10 formats at 192Kb/s.

Move up to Rhapsody Unlimited ($10 per month) and you can download nearly all the tracks in the Rhapsody catalog to your hard drive (at 160Kb/s WMA). With Rhapsody To Go ($15 per month), you can transfer any downloaded songs to any PlaysForSure device.

iPod users can transfer only purchased tracks to their players. Rhapsody automatically converts the DRM scheme to one that's compatible with the iPod, but there's a catch: If you then load that track into iTunes, Apple's software requires you to authorize your PC before it will play the track. So if you purchase tunes from both Rhapsody and Apple, one PC will consume two of your five iTunes authorizations. In addition, Apple claims that Real Networks has no right to perform this conversion, and through firmware updates has periodically prevented iPods from playing songs purchased through Rhapsody.

Various network-streaming devices offer Rhapsody support, including the Sonos Digital Music System. Streamed tracks sound lifeless in A/B listening tests with CDs. Downloaded songs sound much better, but only purchased tracks approach CD quality.

SPECS	
Internet Streaming	WMA at 128Kb/s
Tethered Downloads	WMA at 160Kb/s
Purchases	AAC or RealAudio 10 at 192Kb/s
DRM Technology	Real Helix
Portable Players	Windows Media Players; iPods (purchased tracks only)
Streaming to Your Hi-Fi	Yes, for the entire library
Subscription Pricing	Free to $15 per month
Song Pricing	$0.90 to $1 per song

RHAPSODY **9**

www.rhapsody.com

iTunes

Apple's iTunes is the 800-pound gorilla of the online music world, thanks to the iPod's market dominance. iTunes is also the hands-down best way to manage the music on your iPod. But buying music there doesn't mean you can't also enjoy the benefits that some of these other services have to offer.

With a library of 2 million songs, iTunes offers a deeper catalog than any other online retailer we looked at. You can listen to 30-second snippets of anything in the iTunes catalog, but the only way to hear a full song is to purchase it. Apple encodes purchased music in AAC format at 128Kb/s and uses its own DRM technology—FairPlay—to copy-protect it. Songs cost $1 each, with very little discount offered for full albums.

AAC is an excellent compression algorithm, and the tunes we purchased from iTunes sounded very good. In an A/B/C comparison between the original CD, the iTunes version, and the Rhapsody version, the Rhapsody tracks—which are encoded at a much higher bit rate—came just that much closer to matching the original CD. But we hesitate recommending that iPod owners buy music from Rhapsody because Apple might one day decide to permanently prevent Rhapsody tracks from playing on iPods.

SPECS	
Internet Streaming	N/A
Tethered Downloads	N/A
Purchases	AAC at 128Kb/s
DRM Technology	Apple FairPlay
Portable Players	iPod
Streaming to Your Hi-Fi	AirPort Express only
Subscription Pricing	N/A
Song Pricing	$1 per song

You can stream audio from iTunes to your hi-fi system, but in keeping with Apple's strategy to lock you into its own products, the only way you can do it is with Apple's inadequate AirPort Express.

ITUNES **8**

www.itunes.com

DRM ISSUES

Copy-protected downloaded music uses digital rights-management technology from either Apple (used in iTunes) or Microsoft (used everywhere else except eMusic). In both cases, DRM technology puts the music you've purchased at risk.

All the services we looked at allow you to copy your downloaded music to more than one PC, but with the exception of eMusic, each PC must be "authorized" through the service. Once you reach your limit, you must "de-authorize" another PC to free up a slot. But if one of those authorized PCs experiences a hard drive crash, or your license becomes corrupted, you might just lose your music.

For music protected by Microsoft's DRM technology, you should periodically back up your licenses to something other than your hard drive. Launch *Windows Media Player*, click the Tools menu, choose Manage Licenses, and click Back Up Now.

Policies for replacing corrupted downloads vary from one online service to the next. Make sure you understand and are comfortable with the service's policies before you commit to one.

The foolproof way to protect the songs you've purchased is to burn them to CD. Although it seems like a backward solution, it's better than paying for an entire retail CD when you might want just two or three songs from the disc. Of course, old-fashioned CDs don't force you to jump through any DRM hoops.

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eMusic

If your musical tastes run strongly independent, you'll appreciate eMusic's unique focus. Its library of 1 million-plus songs harbors fewer tracks from *Billboard's* Top 40, but there's plenty of great music from new and underground artists, as well as rare recordings.

Here's an example: Many of the other services have deep collections of Tower of Power releases, including the seminal *Back to Oakland*. eMusic has only one Tower of Power release, but it's a great one: *Direct Plus*, a remastered version of the band's 1981 direct-to-vinyl, live-in-the-studio recording.

We were also impressed by the detailed descriptions and reviews provided for many albums: Most include credits for not just the performers, but the engineers, producers, and even the liner-note authors.

eMusic's subscriptions are a substantial value: The $10-per-month plan entitles you to 40 downloads (you can buy 65 songs for $15 per month, and 90 tunes for $20 monthly). That's just a quarter a tune at the lowest monthly commitment level; plus there are no DRM strings attached and no limit on the number of times you can burn a track to CD. But you'd better use your entire allocation each month, because unused downloads don't roll over. What's even weirder is that if you do use up your month's allocation, you can't buy any more songs until the following month.

Because all songs are encoded in MP3 format, you're assured universal compatibility with any portable player or network streamer, although this applies only to the songs you buy. Sound quality varies depending on the bit rate at which it's encoded, but we didn't hear anything objectionable—and the Tower of Power tracks sounded fabulous.

SPECS	
Purchases	MP3 at 192Kb/s (typical)
DRM Technology	None
Streaming to Your Hi-Fi	Purchased songs only
Subscription Pricing	$10 to $20/month
Song Pricing	$.022 to $0.25 per song

EMUSIC **7**

www.emusic.com

Napster

The original Napster established the concept of free music, and in its latest incarnation, the company has sort of returned to that formula: Sign up with the service and you can listen to any song in its impressive 2 million-song inventory up to five times for free. After that, you're limited to 30-second samples unless you purchase the track (for $1) or become a subscriber. If you're looking for free music, this is the best deal we've found.

The company offers two subscription plans: For $10 per month, you can download as many tethered songs as you'd like and play them on as many as three PCs. With its Napster To Go plan, which costs $15 per month, you can also copy tracks to a variety of portable music players, including all PlaysForSure devices. Individual tracks are priced at $1 each, with albums fetching an average of $10; there are no discounts for subscribers.

Unlike Rhapsody, which allows purchased tracks to be downloaded to an iPod, Napster offers no support at all for Apple's fashionable player.

Napster uses Microsoft's popular (with record labels and service providers, anyway) DRM protection and streams WMA files at 128Kb/s; tethered and purchased WMA tracks benefit from being encoded at the higher bit rate of 192Kb/s. If the concept of renting music appeals to you, Napster's higher bit rate results in better music downloads (although you can't stream them over a private network). If, on the other hand, you're more interested in purchasing tracks, Rhapsody's AAC and RealAudio 10 files sound just a tad lusher to our ears.

SPECS	
Internet Streaming	WMA at 128Kb/s
Tethered Downloads	WMA at 192Kb/s
Purchases	WMA at 192Kb/s
DRM Technology	Microsoft
Streaming to Your Hi-Fi	No
Subscription Pricing	$10 to $15/month
Song Pricing	$1 per song

NAPSTER **7**

www.napster.com

Yahoo Music Unlimited

Bargain shoppers will appreciate Yahoo Music Unlimited's pricing model: The service costs as little as $5 per month if you pay on an annual basis ($7 per month on a month-to-month plan), and single tracks cost just $0.80 each—a dime cheaper than Rhapsody's discounted rate. Non-subscribers pay $1 per track. Plans that enable you to download songs to your portable music player run $10 per month if paid annually ($12 per month on a month-to-month basis).

With a catalog of just over 1 million songs, Yahoo's library is a bit smaller than some of its competitors; but subscriptions also include Yahoo's robust LAUNCHcast Plus radio, which offers more than 150 Internet radio stations. Yahoo Music Unlimited also provides higher-quality streams than most of its competitors: 192Kb/s WMA. Downloaded and purchased tunes are delivered at this same bit rate. All tracks are protected by Microsoft's Windows Media DRM 10.

When you burn purchased tracks to CD, you get the choice of burning them either as CD audio or MP3 tracks.

Yahoo offers more with regard to streaming music within your home than other online-music services—with the exception of Rhapsody—by supporting a handful of devices for streaming music to your hi-fi system. The list of compatible devices, however, is pretty small: D-Link's DSM-320, Linksys' Wireless G Music Bridge, and Roku's SoundBridge and SoundBridge Radio. The network-streaming feature also enables you to access music, including songs downloaded from Yahoo Music Unlimited, that are stored on other PCs on your local network.

SPECS	
Internet Streaming	WMA at 192Kb/s
Tethered Downloads	WMA at 192Kb/s
Purchases	WMA at 192Kb/s
DRM Technology	Microsoft
Streaming to Your Hi-Fi	Yes
Subscription Pricing	$5 to $12/month
Song Pricing	$.080 to $1 per song

YAHOO MUSIC **8**

www.music.yahoo.com/unlimited/

Copyrighted material

MusicGiants

Dig CD quality, but hate ripping? Check out MusicGiants and its WMA Lossless tracks. Just be prepared for a hit to your wallet *and* your hard drive.

A $50 annual fee is applied toward purchases in the first year. Tracks cost $1.29 and albums go for about $15. You'll need lots of storage: Steely Dan's "Jack of Speed," for example, weighed in at nearly 38MB. The compressed version purchased from Rhapsody was just over 9MB.

File size is not quite proportionate to quality: The MusicGiants version of this song sounded identical to the CD, but Rhapsody's sounded nearly as good and we could stream it to our hi-fi.

SPECS	
Purchases	WMA Lossless
DRM Technology	Microsoft
Streaming to Your Hi-Fi	No
Subscription Pricing	$50/year (waived if you purchased $50 in music)
Song Pricing	$1.29 per song

You can't do that with MusicGiants' **songs, because they're protected by Microsoft's** DRM **scheme.**

MusicGiants has licensing deals with EMI, Sony/BMG, Universal, and Warner, but we encountered some major gaps: *Two Against Nature* was the only Steely Dan release we could find, and Frank Zappa wasn't represented at all.

MUSIC GIANTS **7**

www.musicgiants.com

Virgin Digital

Virgin Digital's Red Pass subscription service costs just $8 per month for unlimited tethered downloads to as many as three PCs and two portable players.

A quick double-click from any of the services's 65 commercial-free radio stations takes you to that artist's catalog, where you can purchase individual songs for $1 each and albums for around $9.

But for all its talk about how much Virgin values music, the service delivers relatively low-quality audio: WMA streams and downloads are encoded at just 128Kb/s.

Tethered downloads are protected by Microsoft's DRM technology, which limits the number of compatible portable media players (meaning iPod owners need not apply). You can't stream music from this service to your hi-fi, either, so any songs you don't purchase will remain locked inside your computer or handheld.

SPECS	
Internet Streaming	WMA at 128Kb/s
Tethered Downloads	WMA at 128Kb/s
Purchases	WMA at 128Kb/s
DRM Technology	Microsoft
Streaming to Your Hi-Fi	No
Subscription Pricing	$8/month
Song Pricing	$1 per song

VIRGIN DIGITAL **6**

www.virgindigital.com

MusicMatch on Demand

Yahoo owns MusicMatch On Demand, but operates it independently of Yahoo Music Unlimited. It has a smallish library of 900,000 songs. We found it to be the least appealing of the eight services we reviewed.

Subscribers are expected to pay extra for a full-service player, for example, because some of the features in *MusicMatch Jukebox* are intentionally crippled: It burns CDs at a maximum speed of 8x, and it rips CDs at a maximum of 10x. *JukeBox Plus* will eliminate these restrictions—for an extra 20 bucks.

Subscription rates are relatively cheap, especially if you pay for a year in advance, but you get what you pay for: The only tracks you can download or transfer to a portable player are the ones you purchase for $1 each (albums average $10 each).

Purchased tracks are WMA files encoded at just 160Kb/s, and there's no support for streaming songs to your hi-fi—unless you count the crappy radio stations.

SPECS	
Internet Streaming	Radio only
DRM Technology	Microsoft
Purchases	WMA at 160Kb/s
Streaming to Your Hi-Fi	No
Subscription Pricing	$5 to $7/month
Song Pricing	$1 per song

MUSICMATCH **5**

www.musicmatch.com

THE WINNER

The Compact Disc is the real winner of this contest. You can legally rip, compress, save, back up, copy, and port the songs on a CD as many times as you like and to any portable player or computer you own, totally free from DRM complications. The only real downside is that CDs force you to purchase entire albums. And because the record industry's brain-dead stance on copy protection has rendered the SuperAudio CD and DVD-Audio formats DOA, you won't find higher-quality recordings outside the studios' vaults.

But CDs can't compare with the economic value and instant gratification that online music services offer. Tracks from MusicGiants come closest to CD quality, but its limited library and lack of support for streaming over a private network kept it out of the winner's circle. And as much as we dislike DRM technology, eMusic's limited catalog, and its goofy pricing model, just doesn't work for us.

The services we dug most were those that enabled us to "rent" music. But we eliminated Virgin Digital because of its stingy bit rates. Napster does better, but we culled it from the pack because you can't stream its tracks to your hi-fi system. Yahoo Music Unlimited delivers high bit rates and low prices, and it supports a handful of media-streaming devices; but not our faves: the Squeezebox and the Sonos Digital Music system.

So that leaves Rhapsody as our somewhat imperfect favorite. Purchased songs are encoded at high bit rates using an excellent codec, and the service supports a wide variety of devices to stream music to our hi-fi system.

iPod users are really stuck with purchased songs from iTunes, but don't let that stop you from enjoying the other services Rhapsody offers. MPC

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OS X vs.

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PHOTOGRAPHY BY MARK MADEO

Windows XP

Is Windows XP faster than OS X? The answer will surprise you!

The end is nigh. It was troubling enough when Apple climbed aboard the x86 bandwagon by releasing Intel-powered Macs, but now the company has hacked its own firmware to let Intel-based Macintoshes run Windows XP. We are through the looking glass here, people!

We know you're scared. We were too, but then we realized this would give us the chance to finally run apples-to-apples benchmarks on a Mac to compare WinXP and OS X, and determine, once and for all, which OS rules the performance roost.

BY GORDON MAH UNG

The last sentence uttered by a Mac-lover during the typical PC-vs.-Mac argument is the desperate claim: "But my Mac *is* a PC!" In the old days, we would shake our heads and fight the temptation to pat that person on the head and say: "There, there, Mac user. Here's a tissue." Today, however, that line of reasoning is actually valid. The Mac *is* a PC, thanks to Apple's new *Boot Camp* software, which allows any Intel-powered Mac to run Windows XP.

When we first heard of *Boot Camp*, the question that immediately came to mind was: How fast would it run our suite of PC-based benchmarks? We're not going to make any judgments beyond performance here—that's a discussion for another day. So which is faster, Apple's finest OS or the product of Redmond's loins?

The Hardware

To find out, we acquired a new Intel-based iMac. It's equipped with an Intel Core Duo CPU running at 1.83GHz with 1GB of DDR2/667 RAM (in single-channel mode). The iMac sports a 160GB Seagate 7200.7 drive and an ATI Mobility Radeon X1600 graphics card. We considered adding another 1GB of RAM to the iMac to allow it to run in dual-channel mode, but if Apple's eggheads think single-channel memory is fast enough, by golly, who are we to question them?

We updated OS X to the latest version (10.4.5), flashed the firmware to support *Boot Camp*, installed Windows XP Pro, and let 'er rip, as they say.

For performance testing, we picked applications that had been updated on the Intel Macs to run native x86 code in Universal mode, and that were also compatible with Windows XP. We ultimately found three programs: *Doom 3*, *Bibble Pro 4.7*, and a beta version of *Noise Ninja*.

The Software

Doom 3 is the classic Id game ported to the Macintosh by Aspyr. Bibble Lab's *Bibble Pro 4.7* is a popular multithreaded RAW image converter used by both professional and amateur photogs. PictureCode's *Noise Ninja* is another popular, multithreaded application, used to remove noise from digital photographs.

Additionally, we wanted to see how much of a performance drag Mac users suffer when running the emulation layer required by many older PowerPC-native applications. For this, we ran *Photoshop CS2*, which has not been updated to run in Universal mode.

Finally, we fired up a beta version of *Parallels Workstation* and created a virtual install of Windows XP. *Parallels* is like *VM Ware Workstation* and *Virtual PC 2004*, except it supports Intel's new Virtualization Technology (VT) in OS X. VT will eventually let you toggle between different operating systems on the fly without having to reboot your PC. Right now, however, all it offers is support for hardware acceleration, which means that the guest OS in *Parallels* should run nearly as fast as it does natively.

Our interest in VT support and *Parallels* is purely academic. We've seen implausible reports that applications running inside a virtual copy of XP on an OS X *Parallels* host perform faster than they do running in a native Windows XP install. That seems rather counterintuitive, so we decided to do our own testing to discover the truth.

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OS X vs. Windows XP

The Verdict Is...

The Mac runs Windows XP better than it runs OS X

OS X sure is pretty—no doubt about that. But when it comes to performance, it's like the guy who rolls up to a stoplight in a pristine sports car only to be smoked by the clapped-out hooptie with a fender missing in the next lane. On Mac hardware, apps run significantly faster in Windows XP than they do in OS X.

To be frank, we were rather surprised by the results. Though we expected *Doom 3* to run faster in XP, due to more-mature drivers (it was nine percent faster in XP than in OS X), we naively thought the other applications would behave the same because the hardware was identical. During testing, however, that proved to not be the case. Apps ran much faster in XP—even Universal apps that are optimized for Intel Macs.

Puzzled, we questioned one of the programmers of an app we tested. He said that while most of the code was optimized for Intel Macs, the third-party color-management app still needed to be optimized for Intel by Apple. We'd expect that when all code is x86-native, CPU-intensive tasks would run at the same speed in both OSes.

The real problem for Apple and Mac users is how long it'll take for those optimizations to arrive. When we tested *Photoshop CS2* on both platforms, the Windows XP version decimated the OS X version, which runs in emulated mode. Emulation is slow, that's no big surprise. But when you consider that Adobe won't have an x86-native version of *Photoshop* for the Mac until sometime next year, you can begin to see the problem.

While some might argue that Mac users can just use a different application for image editing, the cold, hard truth is that *Photoshop* is an important app for the Mac, with a massive install base. And if *Photoshop* runs like crap on Intel Macs, you might actually see Mac users switching to Windows

Our tests also put to rest a belief that running Windows XP within OS X using *Parallels* virtualization software is faster than running Windows XP directly on hardware. It's not. We doubted this from the beginning—it just seems impossible that you'd get better performance with the footprint of OS X on top of Windows XP in an emulation layer (even with VT hardware acceleration), because OS X eats RAM and so does the virtualization software.

We give Apple credit for thinking outside the box, though. If you had posted on a Mac forum three years ago that Apple would switch to x86 and let you boot Windows XP, your post would be nuked from orbit, you'd be permabanned, and your IP address would be the target of DoS attacks. Apple's switch to x86 and its support for Windows XP is a tectonic shift that could portend big changes for the PC world. MPC

OS X on the PC?

It can be done, but only for fun

This might surprise you, but we think the odds of Apple introducing its OS to the PC wild before Vista ships are around 75 percent. Yup, that's right. You might be able to buy a Dell, Compaq, or Alienware PC running OS X by early 2007.

Dedicated hackers have even managed to get several versions of OS X (though not the latest) running on non-Apple, Intel-based PCs. It's not for the faint of heart, however, and is illegal if you don't own a copy of the OS. What's more, OS X on non-Apple hardware isn't a realistic platform for day-to-day computing. We're waiting on an official version before we make the switch.

BENCHMARKS

WINXP VS. OS X UNIVERSAL	XP	OS X	% SLOWER
NOISE NINJA BETA (SEC)	**1,575**	1,993	20.97
BIBBLE PRO 4.7 (SEC)	**350**	450	22.22
DOOM 3 (FPS)	**33.4**	30.2	9.58
WINXP VS. OS X PPC EMULATION	**XP**	**OS X**	
PHOTOSHOP CS 2 (SEC)	**413**	1123	63.22
OS X UNIVERSAL VS. OS X PPC EMULATION	**UNIVERSAL**	**PPC EMULATION**	
BIBBLE PRO 4.7 (SEC)	**450**	938	52.03
DOOM III (FPS)	**30.2**	16.3	46.03
WINXP VS. WXP PARALLELS WITH VT	**XP**	**EMULATED XP WITH VT**	
PHOTOSHOP CS2 (SEC)	**413**	958	56.89

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Quiet Your PC Using Free Software

We show you how to use *Speedfan* to program your case fans to spin slow 'n' quiet at idle, and to automatically throttle to full-speed when you need more cooling power.

TIME 00:45 HOURS:MINUTES

Speedfan is a wonderful utility that's absolutely free! It lets you keep track of your motherboard and CPU temperatures, your fan speeds, and the voltages from your power supply. You can even use it to automatically control your fan speeds. With a little tweaking, you can program *Speedfan* to spin your fans up and down according to temperature thresholds that you determine. The upshot is this: You can keep your PC nice and quiet during low-impact tasks such as trolling the *Maximum PC* forums, but crank up the fans to keep your hardware cool when you're playing a game or rendering video.

We're going to show you how to configure *Speedfan* so that your CPU fan's speed automatically adjusts in response to core temperature changes. *Speedfan* is definitely a power user's app—it will do whatever you tell it to, even if that might potentially damage your hardware. Be careful!

While *Speedfan* supports dozens of motherboards, there are many models that don't allow fan-speed changes. Some motherboards might not even display temperatures or fan speeds. Check the *Speedfan* homepage for a list of supported boards; if your board isn't listed you're probably out of luck.

BY JOSH **NOREM**

WHAT YOU'LL NEED

- **SPEEDFAN**
  Free, www.almico.com/speedfan.php
- **CPU BURN-IN**
  Free, http://users.bigpond.net.au/cpuburn

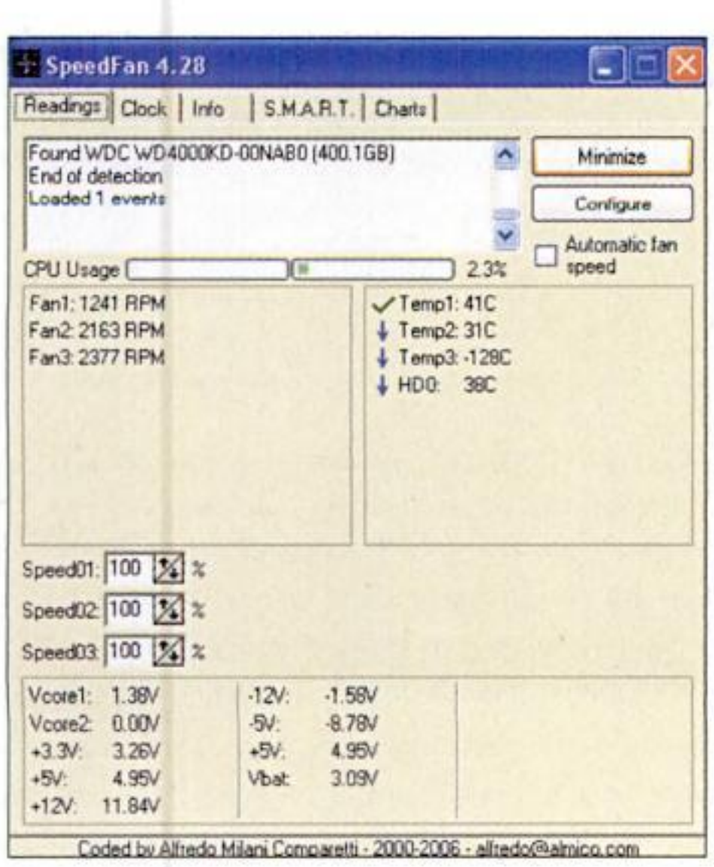
1 Examining the Main Screen

The first time you fire up *Speedfan*, it takes readings from all of the sensors on the motherboard and gives each fan and temperature reading a cryptic label. In the left-hand pane, you'll see the reported fan speeds for all of the fans *Speedfan* detects. Our Asus A8N32 motherboard sports five three-pin fan headers, but we're only able to read fan-speed measurements for three of them.

In the right-side pane, you'll see temperature readings from the sensors on your motherboard, as well as the sensor embedded in most CPUs. On our test system, *Speedfan* reported three temperatures: Temp1, Temp2, and Temp3. We figure that Temp1 is our CPU, Temp2 is the chipset, and we have no idea what Temp3 is, or why it's running at -128 C. (We've seen this before in *Speedfan*—temperatures that are unbelievably low or high. According to the utility's author, these erroneous temps are caused by a sensor that is present but not connected. In general, it's wise to just ignore any reading that seems implausible.) Finally, we see HD0, which is the only hard drive in our rig. In the next step we'll do some testing to verify which sensor is which.

Below the fan-speed readings are boxes labeled Speed01, Speed02, and Speed03. These usually correspond with the fan speeds listed right above them. You'll also see voltage readings for the CPU core (Vcore), and for the various rails on your power supply. The power info can be very helpful if you need to troubleshoot a faulty PSU.

Now that you're familiar with the main window, we'll conduct some tests to determine which sensors and readouts correspond to particular fans and areas of the motherboard.

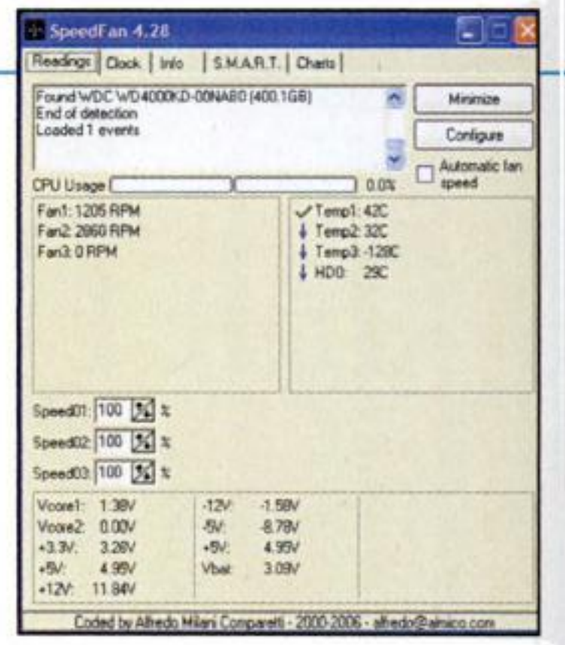


The main *Speedfan* display shows all of the information being reported by the various sensors on the motherboard. The names for the sensors will be whatever the motherboard manufacturer came up with when the board was built.

2 Identify the Sensors and Temperatures

The first thing we want to do is identify which fan readings in *Speedfan* correspond with the fans in our case. The easiest way to do this is to unplug one of the fans, and then see which reading drops to zero. It takes a second or three for the new speed to register, but on our test motherboard, Fan1 is the fan attached to the CPU, Fan2 is for our rear exhaust fan, and Fan3 is a connector meant to control the PSU fan. Make a note of which fan corresponds with which reading in *Speedfan*.

Next, we'll identify the temperature sensors. To find out which temperature is for the CPU, use *CPU Burn-in* to place a 100 percent load on the CPU (be sure to run two instances if you have a dual-core CPU). After *CPU Burn-in* runs for a minute or two, you'll see one temperature jump a few degrees. That number should be the CPU temp. To find out which temp is for the chipset, we recommend temporarily stopping the chipset fan to see which temperature begins to rise.



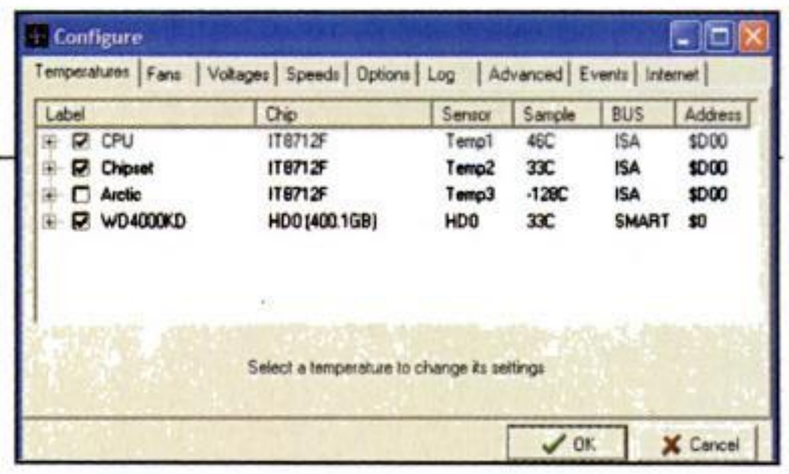
The easiest way to determine the reading for a particular fan is to unplug it. The reading that shows up as "0 RPM" corresponds to the fan in question.

HD0 is obviously our hard drive's temperature, since there's only one reading for a hard drive. If you've got more than one drive, you'll need to shut down your computer, and disconnect all the drives, except your boot drive. Then restart the computer and note the drive reading that shows up in *Speedfan.* Most RAID controllers block the information that *Speedfan* needs to report hard drive temperature. If your drives are in a RAID array, *Speedfan* probably won't detect any drive temps.

3 Rename the Temperature Readings

Once you've figured out which sensor is monitoring which hardware, you need to change the labels within *Speedfan*.

Click Configure. You'll be in the tab labeled Temperatures. Here you'll see the four temperature sensors listed. Click the first item and press F2 to change its name. You should give each sensor as descriptive a name as possible; we named ours "CPU" and "Chipset." If any of the sensors in your machine report erroneous results (like our third sensor, which reads -128 C), disabled them by unchecking their boxes.

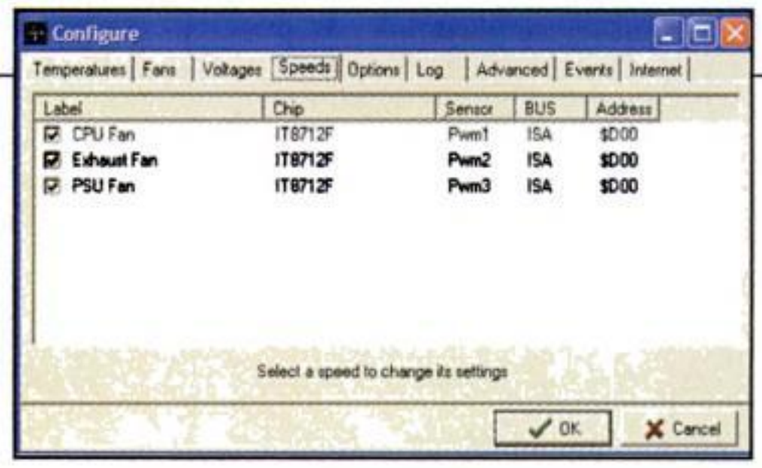

Configure
Temperatures | Fans | Voltages | Speeds | Options | Log | Advanced | Events | Internet
Label | Chip | Sensor | Sample | BUS | Address
CPU | IT8712F | Temp1 | 46C | ISA | $D00
Chipset | IT8712F | Temp2 | 33C | ISA | $D00
Arctic | IT8712F | Temp3 | -128C | ISA | $D00
WD4000KD | HD0 (400.1GB) | HD0 | 33C | SMART | $0
Select a temperature to change its settings
OK
Cancel

***Speedfan* gives each sensor on the motherboard a name, but we rename them all to be more descriptive.**

4 Rename the Fan Labels

With our temperature sensors renamed, we can now focus on the fan speed labels. Click the tab labeled Fans, and you'll see the labels that apply to your board. We're going to rename Fan1 "CPU Fan." Fan2 will become "Exhaust Fan", and Fan3 will be "PSU Fan". If there's a sensor listed here that is orphaned, feel free to uncheck it so it won't clutter up the main interface.

Now that you've renamed the fans, you have to give the same names to their associated fan-speed readings. Click the tab labeled Speeds, and you'll see the same three fan speed labels we saw in the Fans tab. Rename each of these with the same names you used previously and click OK to return to the main window.


Configure
Temperatures | Fans | Voltages | Speeds | Options | Log | Advanced | Events | Internet
Label | Chip | Sensor | BUS | Address
CPU Fan | IT8712F | Pwm1 | ISA | $D00
Exhaust Fan | IT8712F | Pwm2 | ISA | $D00
PSU Fan | IT8712F | Pwm3 | ISA | $D00
Select a speed to change its settings
OK
Cancel

You can rename all the labels in *Speedfan* to make them easier to understand. It also makes temperature monitoring a lot easier.

5 Determine How Much Noise You Can Tolerate

Before you begin automating your fan speeds in the next step, you'll first have to figure out how fast and slow you want your fans to spin. To do that, you need to crank each of your fans up and down manually, via the main screen.

On the main *Speedfan* screen, you'll see three percentage boxes next to the fan names. Each fan is set to 100 percent by default, so you'll want to slow the fans down one at a time until the temperature is stable and you're happy with the noise level. To slow the fan speed, click the down arrow. Most fans will stop spinning entirely if you set them below 40 percent. Once you've calibrated the first fan, adjust each additional fan in your rig. Make sure you keep an eye on your temperatures, though. Be prepared to crank your fan speeds back up if your hardware starts to overheat!

Not all fans and ports will allow speed adjustments. Only fans that plug into your motherboard report their speeds, and only some ports will allow modulation. On our test board we can monitor fan speed on three out of five ports, but we found we could only control the fan speed on two of those three. If you can only adjust the speeds

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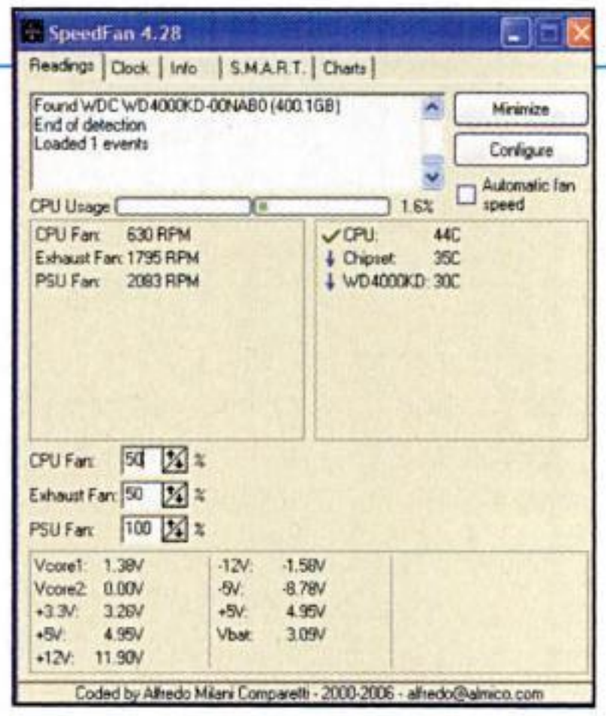
on a couple of ports, we recommend that you use them to connect the CPU fan and the exhaust fan. Those two fans are the most important when it comes to maintaining good airflow inside your case, and are typically among the noisiest in the system.



Speedfan operates like a software-based fanbus, letting you tweak fan speeds by running them at whatever percentage you desire. Not all mobos support this feature, however, so your results may vary.

6 Set Threshold Temperatures

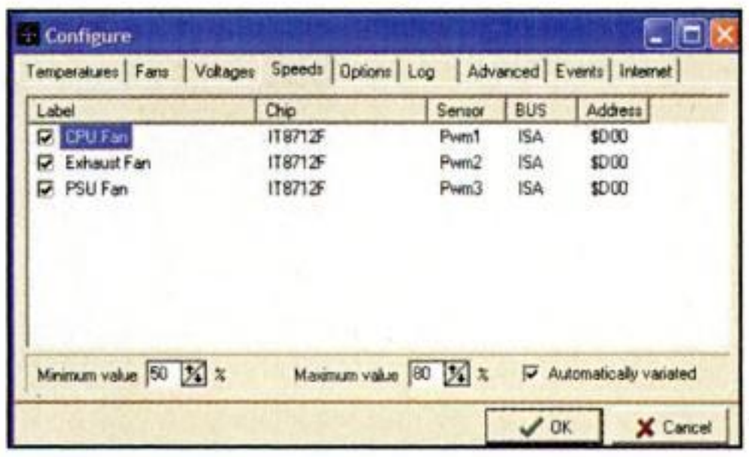
Now for the good stuff: We're going to set up *Speedfan* to automatically adjust fan speeds according to temperature thresholds that we determine. Click Configure, and select the CPU temperature sensor. You'll see two boxes down below labeled "Desired" and "Warning."

The Desired box is the temperature you would like your CPU to be on a day-to-day basis, even during gaming and other heavy workloads. Use *CPU Burn-in* to determine what your CPU's temperature is under full load, then set the Desired temperature a few degrees higher than the maximum temperature you saw under load. For our rig, we chose 40 C for Desired, which is on the low side of the spectrum, but we like to keep our proc chilly. *Speedfan* will automatically increase and decrease fan speed to maintain the Desired temperature at all times.

In the box labeled Warning, input a value that is very high and would be considered a mini-emergency. When the sensor reaches this temperature, it will bypass all of the settings you have established and crank the fan speed up to 100 percent. Once the sensor's temperature moves back to the safe zone (a few degrees below the Warning temp), it will lower the fan speed. A common Warning temp would be 70 C. You can also select Desired and Warning temperatures for the other sensors on your motherboard at this time.

7 Set Your Fans' Speed Limits

Click Configure, then click the tab labeled Speeds. Select the CPU fan. You'll notice there are two boxes at the bottom for minimum and maximum values. The minimum value is the lowest speed that *Speedfan* will use for the fan. It will spin at this speed as long as the temperature for that sensor is below your Desired temperature.



Speedfan ignores your maximum speed setting if temperatures rise above the warning level of your choosing.

The maximum value is the fastest speed you'd ever want the fan to spin under normal conditions. We recommend setting the maximum value to the lowest setting your fan can run and still keep your rig at a steady temperature under full load. The fan will spin up to this maximum value when CPU temperature begins to rise. If the CPU temp hits the Warning threshold you set in the previous step, it will crank the fans to 100 percent, regardless of your setting here. Before you click OK, make sure you check Automatically Variated for every fan that you want *Speedfan* to control automatically. Finally, go back to the main screen and check the box labeled Automatic Fan Speed. MPC

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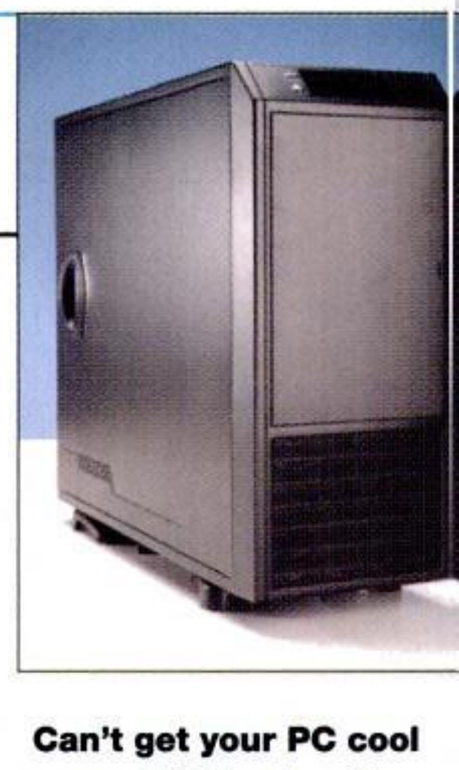
Ask the Doctor



CATCHING A BUZZ

*I have a problem with my motherboard's sound system that's driving me crazy. I built a computer consisting of an Asus A8N32-SLI Deluxe motherboard with an AMD 4400+ X2, 2GB of RAM, and a Leadtek WinFast PX7800 GT TDH videocard. The computer works great, but the minute a game starts, I hear a low buzz over my speakers. This happens in games like **World of Warcraft** and **Splinter Cell**. I've noticed a different—but equally annoying—buzz when I drag windows around the desktop.*

I've updated the chipset, onboard sound, and videocard drivers, but nothing seems to help. I'm at a loss as to how to fix this, short of buying a new soundcard. Do you have any suggestions?

—Scott Moore

The causes of onboard audio noise can be difficult to track down. It could be your power supply, poor shielding on one or more of the cables in your system, or simple random oddness from the onboard audio sharing an IRQ with another device. You might also have poorly shielded speakers, so try unplugging them from the PC and then plugging them back in again. If that doesn't work, try moving the speakers to a different location, or using headphones. The next troubleshooting step is to download and install the latest audio drivers for the sound device (uninstall the existing driver, first). You might also try using the Windows Device Manager to uninstall and reinstall the integrated audio. Moving to inside-the-case solutions, reorient your internal power cables away from both the onboard-audio chip and any front- and back-panel audio cables and connections. If all else fails, and you have a spare power supply, try swapping it out.

INFECTION CONTROL

My PC has been infected with spyware that hijacks my web browser and set its home page to PerfectedSecurity.com. I've tried four anti-adware programs and none of them has any effect. How can I get rid of this thing?

—Jim Klein

It sounds like you've picked up a nasty case of Smitfraud. One known cure is to download smitrem.exe from http://noahdfear.geekstogo.com/ to your desktop. Double-click the file to extract the program to its own folder. Restart Windows XP in Safe Mode and log onto the infected user account. Open the Smitrem folder and double-click the file labeled RunThis.bat. Follow the onscreen prompts to purge the infection.

SHOULDN'T IT GO TO 11?

*I finally built myself an SLI rig, complete with an Asus A8N32-SLI Deluxe motherboard, two eVGA e-GeForce 7800 GT videocards, and an X-Fi Extreme Music soundcard. But two things are bugging me. Bugger No. 1: When I installed **Doom 3**, the game configured itself to High Quality, instead of Ultra Quality, and 800x600 resolution, instead of, well, anything higher! Bugger No. 2: I changed the settings and experienced some visual abnormalities, so I changed them back again; unfortunately, the abnormalities remained. What gives?*

—Robert Tuzzolino

Seeing odd images in your games while SLI is enabled? Make sure you haven't inadvertently turned on the GPU Load Balancing option.

The auto-configuration tools in games, *Doom 3* included, generally suck. This has more to do with Windows and DirectX than it does with the games themselves, but the fact remains that you're better off configuring the game yourself. I wouldn't advise setting *Doom 3* to Ultra Quality, though, unless you upgrade to videocards with 512MB frame buffers (when it comes to SLI, 256 plus 256 doesn't equal 512). Regarding the visual abnormalities, check Windows' Display Properties: You might have "Show GPU load balancing" enabled.

CHILL, BABY

I'm planning to build my next PC, and I was wondering if it would be possible to house it inside a functioning mini fridge. Well, I know it's possible, but do you think the environment would be too humid? Do you think the ambient moisture would fog up the drives or instigate corrosion?

—Jay Caldwell

Can't get your PC cool enough? Check out Sytrin's air-conditioned Nextherm—it uses a TEC unit to send chilled air into the case's interior.

Well, I guess our Rig of the Month column is proof that when it comes to enclosures for your PC, just about anything is possible. But do you really want to go to all that trouble if you're just looking to cool your rig? The stock cooling devices found on most hardware is sufficient to keep it within the manufacturers' recommended thermal range. And if the stock part isn't adequate, for whatever reason, there's no shortage of aftermarket products, with water-cooling kits being among the most exotic. If you want to go still further over the top, take a look at Nextherm's ICS 8200: This case, which we reviewed in our March 2006 issue, boasts a cooling unit with a Peltier cold plate. A fan blows air over the cold plate, sending slightly chilled air into the case. You can check it out at www.sytrin.com. The Nextherm is a bit pricey—selling for $360—but building inside it would be a heck of a lot easier than building inside a real refrigerator. MPC

SECOND OPINION

My boss recently brought me his Dell, which was experiencing the exact same dead-keyboard problem described in the "Keyboard Amnesia" letter in your May column. I tried everything I could think of, including calling an IT friend and spending an hour on the phone with Dell tech support. The Dell rep told me to reinstall XP, which I was about to do when I noticed a strange stopwatch icon in the taskbar tray: It turns out that FilterKeys, one of Windows accessibility options, had been activated. The tool is supposed to prevent repeated keystrokes and/or slow down the repeat rate, but in this case, it shut off *all* keystrokes. I'm not sure how the tool was activated, but as soon as I turned it off, the problem disappeared. Remember, not all problems are high-tech; sometimes it's better to look for the simple solutions, first.

—Bob Cooper

There's no need to fear! *Maximum PC's* Doctor is here! With the speed of lightning and the roar of thunder, he'll cleave your PC snafus asunder. Beam your distress signal to doctor@maximumpc.com.

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The World's First Modular Power Supply Just Got Better!

ULTRA X CONNECT

Patent Pending

Slim Cable FLEXFORCE® 2

What is FlexForce?

Manageable
FlexForce Cables are designed to be easily routed and hidden within your case.

Increased Airflow
Special design allows air to travel 30% more effective then standard cables, increasing efficiency.

Design
Cables are dressed in a sleek looking titanium like finish.

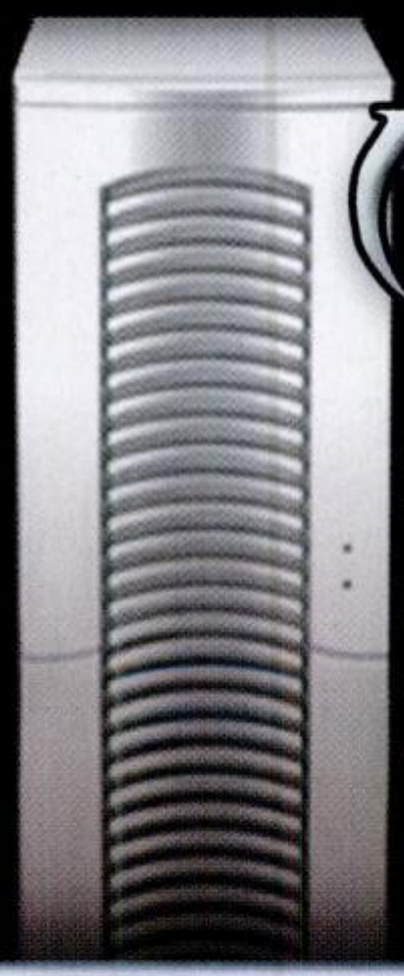
DR DUAL RAIL TECHNOLOGY

What is Dual Rail Technology?

Better Power Distribution
The X-Connect distributes 12V power to the components that require it the most in modern PC's.

Dedicated CPU Rail -
Dedicated 12V Rail for the 2x2 Motherboard Connector

More stable power when you need it...



ALUMINUS

GAMING CASES

Ultra Aluminus Aluminum Case

This all new Ultra Aluminus lightweight aluminum case is in a class by itself when it comes to dazzling looks and phenomenal performance for a wide range of systems. Yes, this Ultra Aluminus case is 100-percent pure eye-candy. As its name implies, the Ultra Aluminus has been crafted using the finest, most durable lightweight aluminum on the market. And it includes a large innovative clear side panel.

Fry's Electronics Outpost.com | MICRO CENTER The Ultimate Computer Store | TigerDirect.com | ZipZoomfly.com

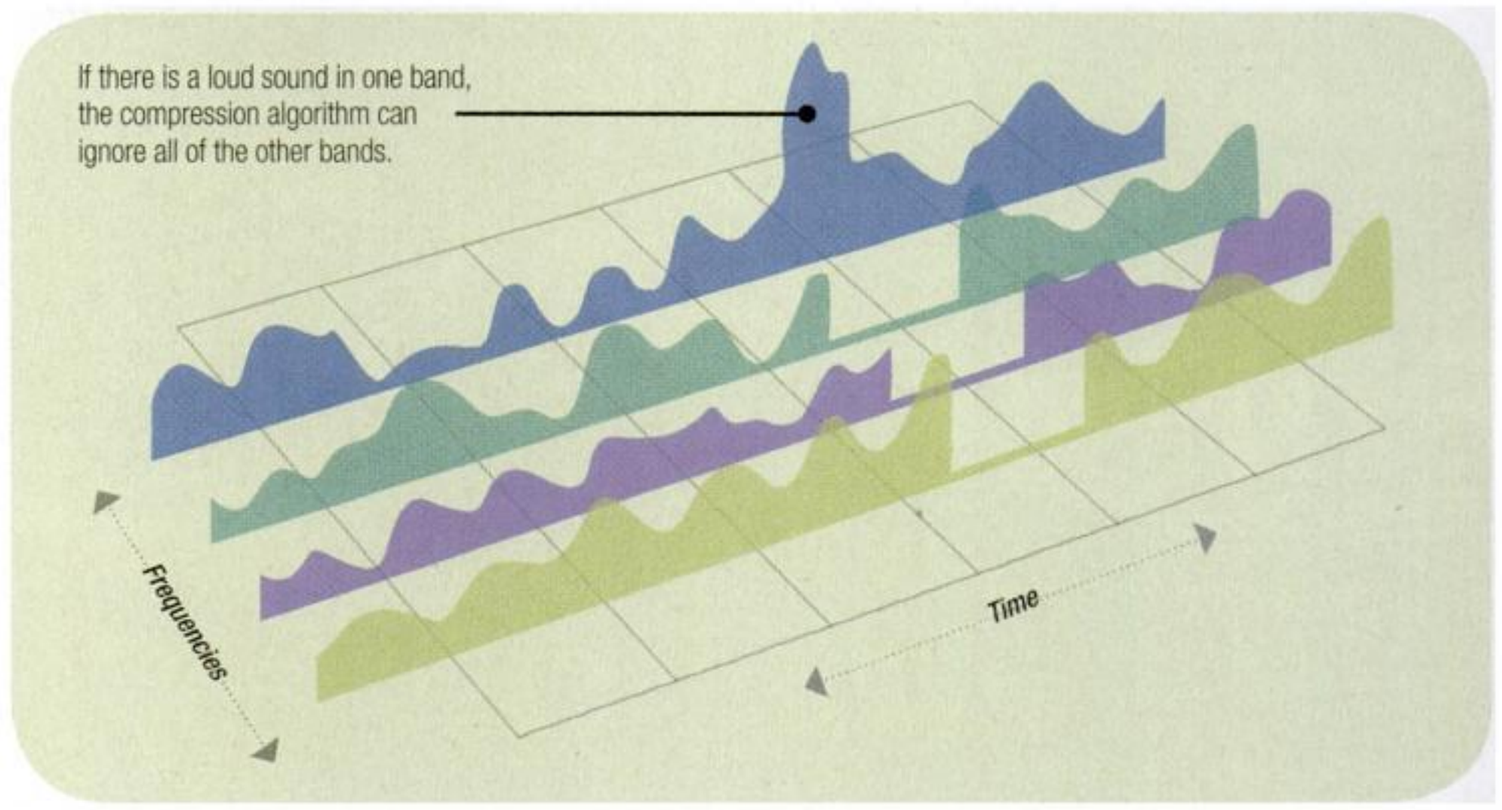
www.ultraproducts.com/x2

White Paper: Audio Compression Algorithms

Modern PC technology can shrink the size of digital audio files without compromising musical fidelity. Here's how audio compression works.

BY GORD **GOBLE**

HOW IT WORKS **Lossy audio compression**



When one frequency recorded at a greater amplitude masks similar frequencies recorded at lesser amplitudes, a lossy codec will discard those masked frequeincies on the presumption that they won't be heard anyway.

When musicians and studio engineers discuss compression, they're talking about a means of subtly rendering a recording's loud passages quieter and its quiet passages louder. It's a tool they use to ensure that a singer's voice, for example, holds its place in the final mix whether the singer is whispering or screaming.

The compression used to reduce the space that an audio file consumes on your MP3 player is a very different animal. This type of compression is what made DVD movies, wireless media streaming, HDTV, satellite radio, portable music players, and online music stores possible.

This digital audio revolution kicked off in the early 1980s with the ratification of the Philips/Sony-developed "Red Book" compact disc standard. The Red Book specifies, among other things, that two-channels of audio are to be encoded using pulse-code modulation with 16-bit resolution at a sample rate of 44.1kHz (meaning the analog waveform is sampled 44,100 times each second). As the anointed successor to fragile vinyl LP records capable of storing 60 minutes of audio, the 5.25-inch, semi-indestructible compact disc, with its capacity to store 74 minutes of audio, was revolutionary. No one gave a second thought to the fact that one minute of Red Book audio sucked up more than 10MB of storage space.

THE BIG SQUEEZE

Fast-forward to the 1990s: The International Standards Organization's Motion Picture Experts Group (MPEG) was working on a standard for squeezing video into 5.25-inch discs. Uncompressed content obviously wouldn't work, and it just so happened that the German company Fraunhofer-Gesellschaft had been researching a means of shrinking high-quality audio recordings so they could be transmitted over telephone lines. MPEG adopted Fraunhofer's audio-encoding algorithm for the audio portion of the MPEG-2 video standard, and dubbed it MPEG Audio Layer III (MP3).

But Fraunhoffer's method of making a digital audio file smaller was to use fewer bits to describe it, sacrificing audio fidelity in the process. MP3 is a lossy codec, which means that the encoding process discards some of the original audio data (in fact, a sloppily encoded MP3 file throws away *a lot* of the original data). And yet, most consumers considered even early MP3s to be comparable to Red Book audio and they were willing to trade fidelity for file size.

A handful of other lossy codecs have since gained market traction. Several online music retailers have adopted Microsoft's WMA (Windows Media Audio). And Fraunhofer's AAC (Advanced Audio Coding), the designated audio format for the MPEG-4 video spec, is now the default audio file format for Apple's iPod and iTunes music store. There's also the free Vorbis codec, which the open-source community developed in response to Fraunhofer's decision to charge licensing fees for the MP3 codec. Some of these newer formats do a much better job of compressing audio files, but how can any technology throw away part of a song without our ears detecting the sleight-of-hand?

PSYCHOBABBLE

Lossy compression codecs operate under the principles of psychoacoustics—the study of how human beings perceive sound. Because most humans can't hear sounds below a frequency of 16Hz or above 16kHz, a lossy compression codec encodes sounds outside that range, using less resolution—fewer bits—or it might not encode them at all. In a nutshell, lossy compression presumes that because you theoretically can't hear it, you won't miss it.

That part of the process is relatively easy. Dealing with sounds that do fall within the spectrum of human hearing requires a great deal more computational power. And an effective codec can identify and remove sounds that our ears can't detect even though they are within that frequency range.

If you've ever listened to a song and realized you can't pick out a given instrument because the wall of sound around it drowns it out, you've stumbled onto the prime hunting grounds of lossy compression algorithms. These codecs search for frequencies rendered inaudible by the dominance of other sounds with the same or similar frequencies, but that have been recorded at greater amplitude. They also search for sounds that will be masked by the trailing or rising edges of other sounds.

In some cases, the codec will identify sounds that don't fall within one of the 24 critical bands that human hearing is more sensitive to. These 24 specific frequencies,

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ranging from 100Hz at the low end to 4kHz at the high end, are a byproduct of our ear's construction. Audio events within this range will sometimes mask sounds outside the range. As before, if the algorithm concludes that these sounds won't be intelligible, it will encode them at a lower resolution or it might discard them altogether.

Some lossy compression algorithms use pattern recognition to further reduce the amount of information required to describe data (we'll get to lossless codecs in a moment). The file is buffered and then analyzed to interpret the prevalence of redundancies and repetition, in much the same way you might examine this paragraph and identify repeated words or letters. If you developed a program that replaced each repeated word with a single character for storage, and then replaced that signal character with the whole word for reading, you could shrink the amount of data in the paragraph without losing any of its original meaning.

When used too aggressively, lossy compression introduces audible artifacts, such as ringing, pre-echo, and warbling. But a carefully encoded song can fool even a critical listener's ear.

A NO-LOSE SITUATION

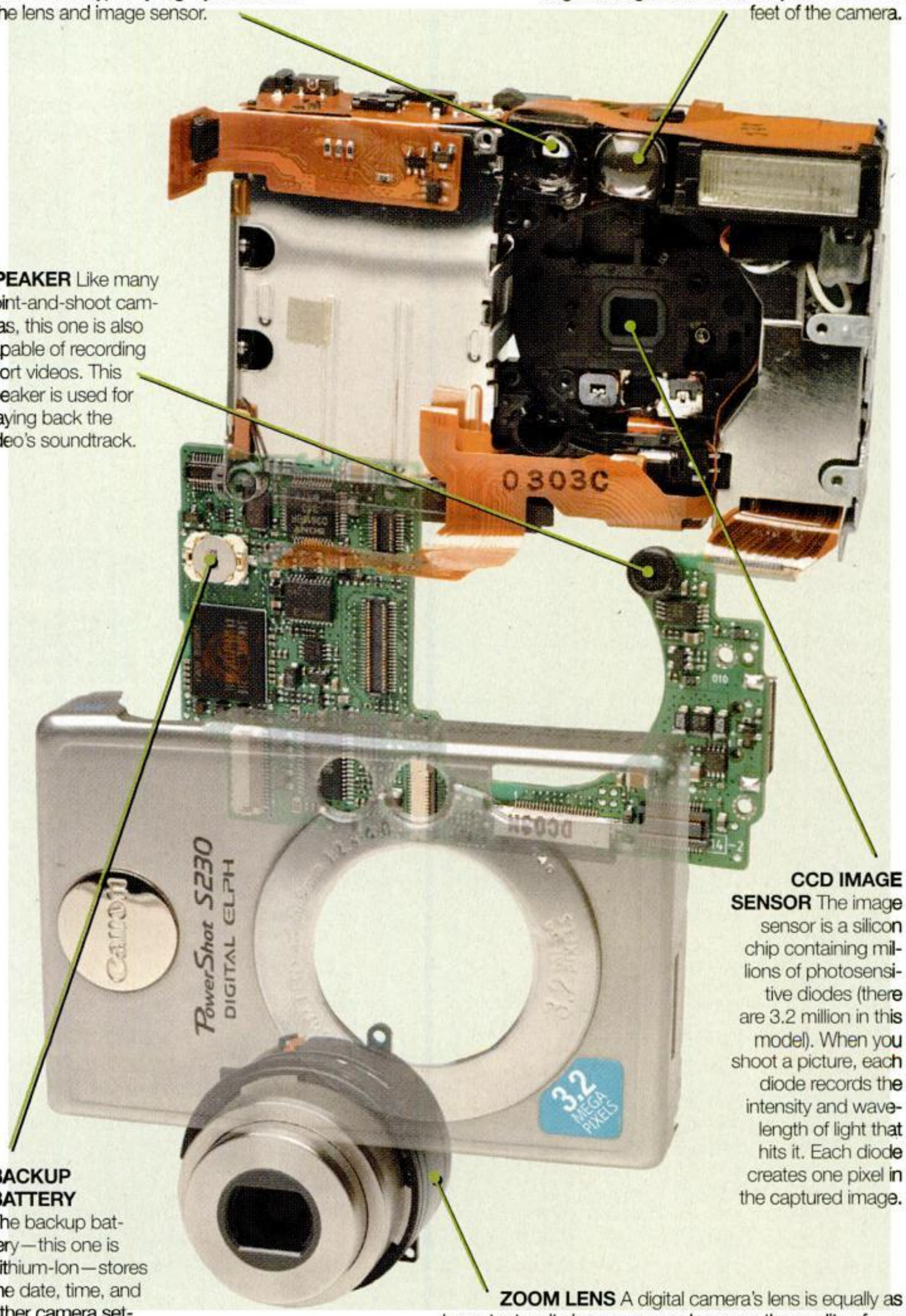
Lossless compression algorithms are much more ambitious: Their goal is to create a bit-for-bit clone of the source—discarding none of the original data—inside a file that requires much less storage space. They're not as ruthless as lossy algorithms, but the typical lossless compression ratio of 2:1 is none too shabby.

Lossless compressors use far simpler mathematics than the psychoacoustic models that lossy codecs depend on, with linear prediction being one of the most common. In this operation, the algorithm forecasts an audio signal's future values based on previously observed samples. In this respect, they behave very much like file-compression tools such as *WinZip*: They squeeze the file down without discarding any of the data contained within. When you unzip a document stored in a zipped file, for instance, the decompressed document contains every letter and punctuation mark that was in the original file.

Common lossless compressors include Microsoft's WMA Lossless, Apple Lossless, and FLAC (Free Lossless Audio Codec). When you decompress a song that's been crunched by a lossless codec, you get back every frequency it possessed before it was processed. And that explains why interest in lossless compression is rising as prices for digital storage and online bandwidth are falling. MPC

Point-and-Shoot Digital Camera

When we disassembled this Canon PowerShot point-and-shoot digital camera, we were amazed at the number of intricate components inside. Needless to say, the camera was nonfunctional when we put it back together. We're still waiting to hear back from Canon about our warranty claim.



OPTICAL VIEWFINDER The viewfinder is used to compose your image. In point-and-shoot models such as this one, it's typically slightly offset from the lens and image sensor.

AUTO-FOCUS ASSIST BEAM A bright-white LED behind this projection lens assists the auto-focus mechanism inside the lens. The LED is bright enough to illuminate objects within 9.8 feet of the camera.

SPEAKER Like many point-and-shoot cameras, this one is also capable of recording short videos. This speaker is used for playing back the video's soundtrack.

CCD IMAGE SENSOR The image sensor is a silicon chip containing millions of photosensitive diodes (there are 3.2 million in this model). When you shoot a picture, each diode records the intensity and wavelength of light that hits it. Each diode creates one pixel in the captured image.

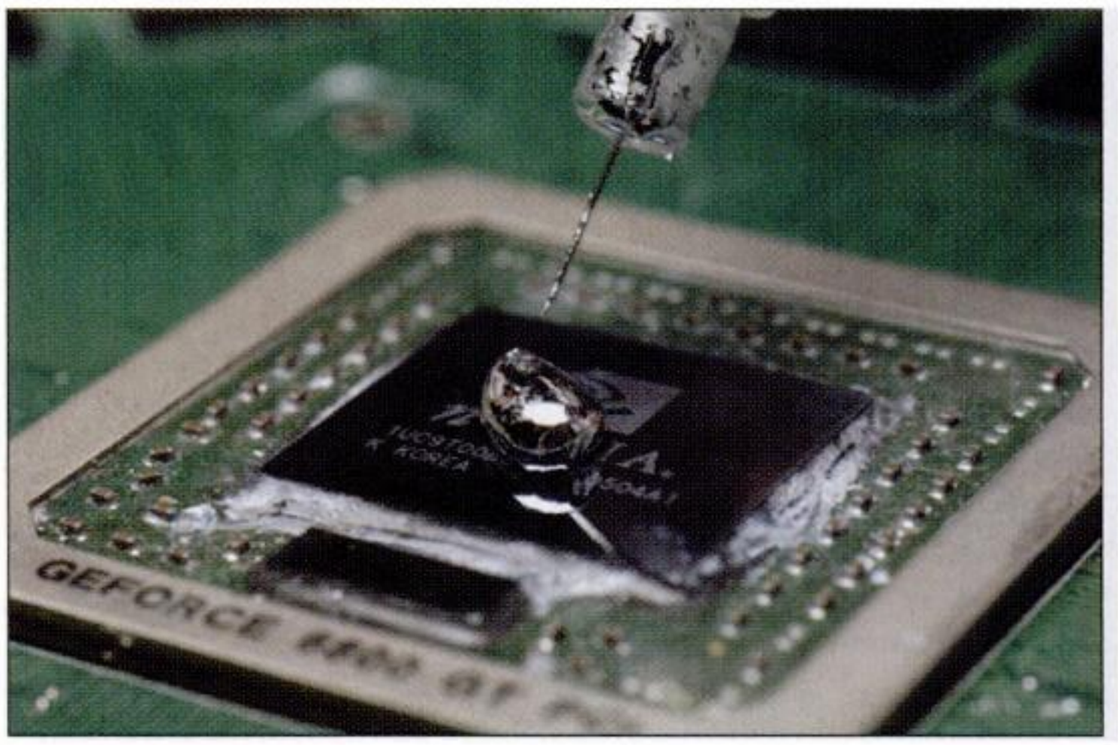
BACKUP BATTERY The backup battery—this one is Lithium-Ion—stores the date, time, and other camera settings while the camera's main battery is being recharged or replaced.

ZOOM LENS A digital camera's lens is equally as important as its image sensor, because the quality of one directly impacts the performance of the other. This camera is outfitted with a 2x optical zoom lens, consisting of seven elements (including three aspherical lenses, which reduce distortion) organized in five groups.

JOSH **NOREM**

Tests Liquid-Metal Thermal Compound

It certainly looks cool, but is it any better than traditional thermal paste?



A tiny syringe (good for four to five applications) of liquid metal costs $14! To be honest, it's not worth it.

Back in January, I tested popular thermal pastes to see if there was a difference between high-end silver and generic paste. As it turned out, there *was* a difference, but just a slight one. To some, that justified using the good stuff. To us, it made the argument that what you choose is not as important as the fact that you just use something: a pad, paste, silver, copper, or ceramic—they're all good.

This month the thermal paste debate has been rekindled with the arrival of Coolaboratory's Liquid Pro liquid-metal thermal "heat conducting agent" (**$14, www.coolaboratory.com**). The logic behind it is simple: Standard thermal paste is essentially paste mixed with bits of metal. Because heat is conducted through the metal, it's only logical that solid metal would be more conductive than a mixture of paste and metal bits. In fact, the product's manufacturer claims its liquid metal has a "conductivity value" of 82, compared to regular thermal paste's value of 6 to 9. But do those numbers have a basis in reality? The more important questions are how does this stuff work in the real world, and can it hold a candle to everyone's favorite thermal paste Arctic Silver 5?

To find out, I grabbed a GeForce 6800 GT videocard to use as a test subject. (The 6800 GT actually runs hotter than our new zero-point Athlon 64 FX-60 CPUs.) I fitted the 6800 GT with Zalman's VF900 Cu heatsink, and tested an assortment of thermal pastes. In between tests, I thoroughly cleaned the core with Arctic Silver's ArctiClean.

The results? The liquid metal was the best-performing interface material we've ever tested, with Arctic Silver 5 coming in a very close second. Both compare quite well to the other pastes we tested, running 3 to 8 degrees Celsius cooler than those products, which is incredible.

Unfortunately, there are multiple drawbacks. First, the liquid metal is twice as expensive as regular thermal paste and there's not much in a syringe. We'd reckon one syringe provides four to six applications. Second, it has to be painted onto the cooling surface, but it's very difficult to spread because it's not adhesive at all.

Though Liquid Pro is very cool, in every sense of the word, its tiny performance advantage doesn't justify its exorbitant cost.

BENCHMARKS

	LIQUID PRO	ARCTIC SILVER 5*	MICROSI SILVER	COOLER MASTER	ARCTIC LUMIERE
IDLE (C)	**43**	45	47	49	46
LOAD (C)	**52**	**52**	55	60	56

*Best scores are bolded. Temperatures were obtained via the Forceware drivers. Idle scores were determined by letting the card run idle for a half-hour. Load temps were achieved by looping 3DMark06 for one hour. * Arctic Silver 5 requires a 200-hour break-in period to achieve maximum performance, and this paste was not fully broken-in.*

Gordon Mah Ung

Updates Our Benchmarks, Again

Call it a benchmark service pack

New benchmarks don't always go over as smoothly as you'd hope. When we revamped our new test beds to AMD Athlon 64 FX-60 systems and updated all six of our benchmarks, there was always the risk of hitting a snag. Well, we actually hit two snags, one was easy to fix, the second, not so easy.

The first was our new *Quake 4* benchmark. We had hoped to roll over from the 1.1 beta to the full 1.1 patch but a bug in the code that damaged widescreen monitors forced id Software to recall the 1.1 patch. The 1.2 patch wasn't released until after our new benchmarks were decided. Normally, we stick with the stock version of the game until we pick a new benchmark, but we decided that the switch to the 1.2 patch from a beta was worth it.

Unfortunately, as part of the 1.2 patch, id also updated the network code, which broke our previous timedemo. We have since re-recorded a timedemo in the same level as the previous demo, but any *Quake 4* scores going forward can't be compared to the score of the first system we reviewed.

The second problem is a little more vexing. We chose *Nero Recode 2.0* for its multithreading support when converting movies to a Sony PSP viewable format. When converting to MPEG-2 video, we see both cores sweating, but for the PSP's MPEG-4, it's sporadic. Sometimes both cores hit 100 percent and sometimes they'll each hit just 50 percent. We're working with Ahead to resolve the issue and hope to have a solution soon.

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How We Test

Real-world benchmarks. Real-world results

Computer performance used to be measured with synthetic tests that had little or no bearing on real-world performance. Even worse, when hardware vendors started tailoring their drivers for these synthetic tests, the performance in actual games and applications sometimes dropped.

At *Maximum PC,* our mantra for testing has always been "real world." We use tests that reflect tasks power users perform every single day. With that in mind, here are the six benchmarks we use to test every system we review.

SYSmark2004 SE: This is an update of the *SYSmark2004* benchmark, which uses a suite of such common applications as Microsoft *Word, Excel, PowerPoint*, Macromedia *Dreamweaver*, *Flash,* and *Winzip* to test general performance. It isn't heavy in multithreading, but it does feature multitasking tests.

Adobe Premiere Pro 2.0: We finally ditched our old standard-def *Premiere* test for one that uses high-def source material. The test is multithreaded, uses the GPU for transitions, and is brutal. It takes about an hour on our zero-point to render a short two minute, 46 second benchmark movie in the program.

Adobe Photoshop CS2: We start with a RAW photo shot with a Canon EOS 20D, and apply a crapload of filters and other tasks from *CS2* to see just how fast a rig can chew through the workload. Because we use every filter we can, the test is more fair and balanced than the usual cherry picking of *Photoshop* tests.

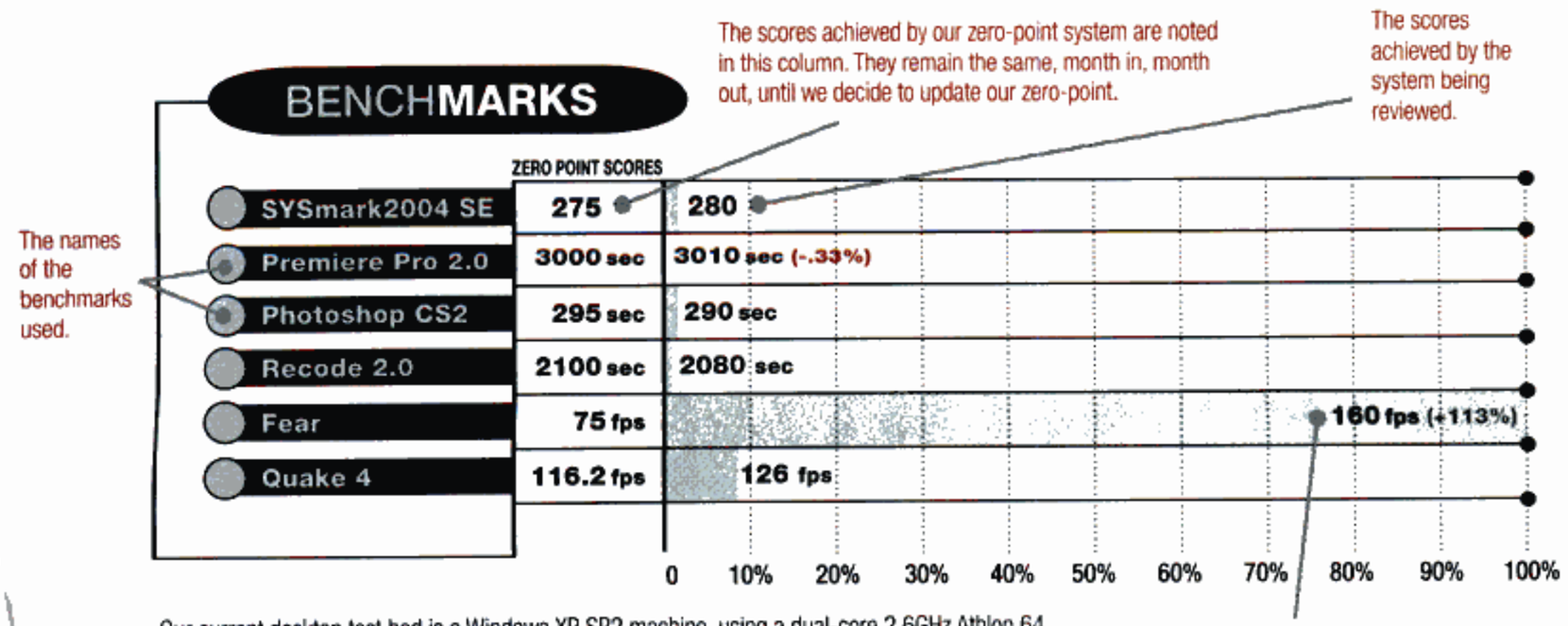
Ahead Nero Recode 2.0: *Nero Recode 2.0* is one of the fastest video-transcoding utilities. We copy unencrypted VOB files to the hard drive, then convert the movie to the Sony PSP's MPEG-4-based format. The program is heavily multithreaded, and shows marked performance increases on dual-core machines.

Quake 4: Based on the *Doom 3* engine, *Quake 4* is a popular OpenGL game. We run our test at 1600x1200 with 4x antialiasing and 4x anisotropic filtering. Generally, more robust OpenGL drivers yield better performance. We use a custom timedemo recorded using the 1.2 patch, which supports Hyper-Threading and dual-core processors.

FEAR: Monolith's *FEAR* is a cutting-edge DirectX game that pushes graphics hardware and systems to the limit. We run *FEAR* at 1600x1200 with soft shadows, physics, and audio acceleration enabled, and using the 1.03 patch.

How to Read Our Benchmark Chart

Maximum PC's test beds double as zero-point systems, against which all review systems are compared. Here's how to read our benchmark chart.



Our current desktop test bed is a Windows XP SP2 machine, using a dual-core 2.6GHz Athlon 64 FX-60, 2GB of Corsair DDR400 RAM on an Asus A8N32-SLI motherboard, two GeForce 7900 GTX videocards in SLI mode, a Western Digital 4000KD hard drive, a Sound Blaster X-Fi soundcard, and a PC Power and Cooling Turbo Cool 850 PSU.

Every month we remind readers of our key zero-point components.

The bar graph indicates how much faster the review system performed in respect to the zero-point system. If a system exceeds the zero-point performance by more than 100 percent, the graph will show a full-width bar and a plus sign.

Our monthly category-by-category list of our favorite products. New products are in red.

High-end videocard:
XFX GeForce 7900 GTX (model PV-T71F-YDD9)

Midrange videocard:
eVGA 7900 GT

Soundcard:
Creative Labs X-Fi Xtreme Music

Hard drive:
Western Digital WD5000KS

External backup drive:
Western Digital Dual-Option Media Center 320GB

Portable USB drive:
Seagate Portable External Hard Drive 100GB

DVD burner:
Plextor PX-716A

Widescreen LCD monitor:
Dell 2405FPW

Desktop LCD monitor:
NEC 90GX2

Socket 939 Athlon 64 mobo:
MSI K8N Diamond Plus
With AMD's new AM2 CPUs and motherboards in the pipe, we recommend that you wait if you want an upgrade path beyond FX-60

Socket 775 Pentium 4 mobo:
Asus P5WD2-E Premium
We recommend that readers wait for P4 boards that support Conroe

Portable MP3 player:
Apple iPod

5.1 speakers:
M-Audio Studiophile LX4 5.1 (LX4 2.1 with 5.1 Expander System)

2.1 speakers:
M-Audio Studiophile LX4 2.1

Mid-tower case:
Lian Li PCV-1100

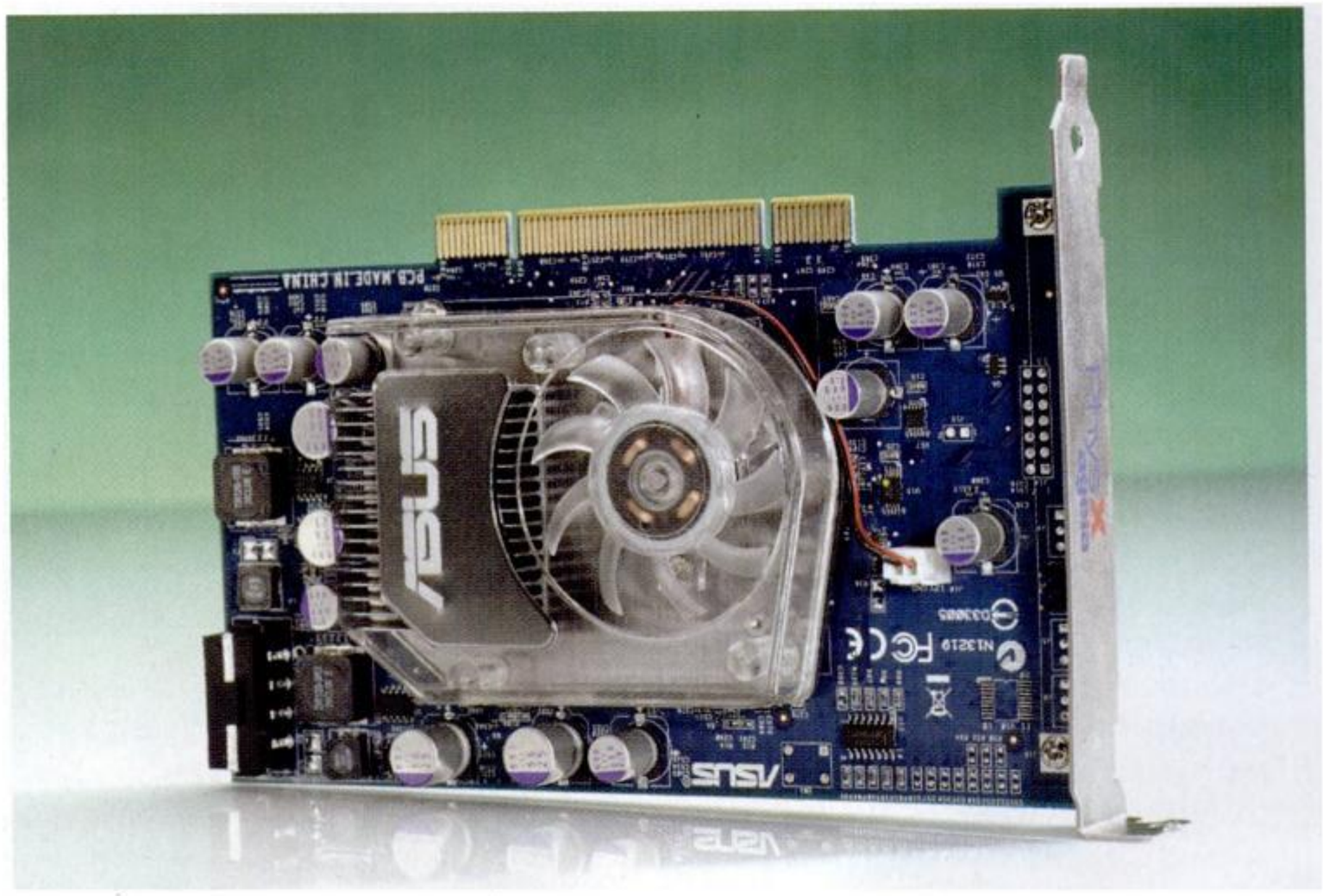
Full-tower case:
Silverstone TJ07

Games we are playing:
Tom Clancy's Ghost Recon: Advanced Warfighter, SiN, Elder Scrolls IV: Oblivion, Battlefield 2

Copyrighted material

Asus PhysX P1/128MB

Does the promise of physics acceleration warrant a leap of faith?



The PhysX chip at the heart of Asus' physics-accelerator card is just a wee bit ahead of its time. Consumers should take a wait-and-see approach on this one.

In religious circles, some worshipers kiss poisonous snakes to demonstrate their faith in God: "The Lord will protect me." In retail circles, some consumers buy largely unproven products that establish a wholly new market category to demonstrate their faith in technology: "This good idea will benefit me."

And when it comes to Ageia's PhysX physics-processing unit, there hasn't been a product launch that has required such a leap of faith since 3dfx unveiled its Voodoo Graphics chipset back in 1996. Does Ageia's good idea justify that degree of trust? We spent some quality time with Asus' implementation of the PhysX board to find out.

Anyone who's played *Half-Life 2*—and that's anyone who's the least bit interested in computer games—knows how much fun a good physics engine can add to a game. But limited processor power constrained the degree to which you could interact with that game's environment. Some objects could be shoved around, a few could be blown up, but the vast majority of the environment remained static and unresponsive to your actions in the game.

Ageia has been telling us for months that its PhysX physics-processing unit (PPU), the silicon that forms the heart of this new Asus card, has the power to render just about *everything* in a game environment interactive. And with a die size of 182 square millimeters, a transistor count of 125 million, and 128MB of DDR memory on board, the hardware is definitely there.

What's *not* there—at least not now—is a comprehensive collection of games to tap the hardware's power. Yes, it's that old chicken-or-the-egg conundrum: There's little reason to buy new hardware if there's no software to take advantage of it, but developers are loathe to create software for hardware that doesn't have an installed base. Consumers aren't the only ones asked to make leaps of faith.

We'll return to the software question in a moment, but allow us to address another issue first: In some machines, installing a PhysX card will mean giving up your soundcard. The card plugs into a PCI slot, just like a Sound Blaster X-Fi card, but in our test bed (an Asus A8N-32 SLI Deluxe motherboard with two dual-slot GeForce 7900 GTX videocards), there's only one exposed PCI slot. Goodbye, X-Fi.

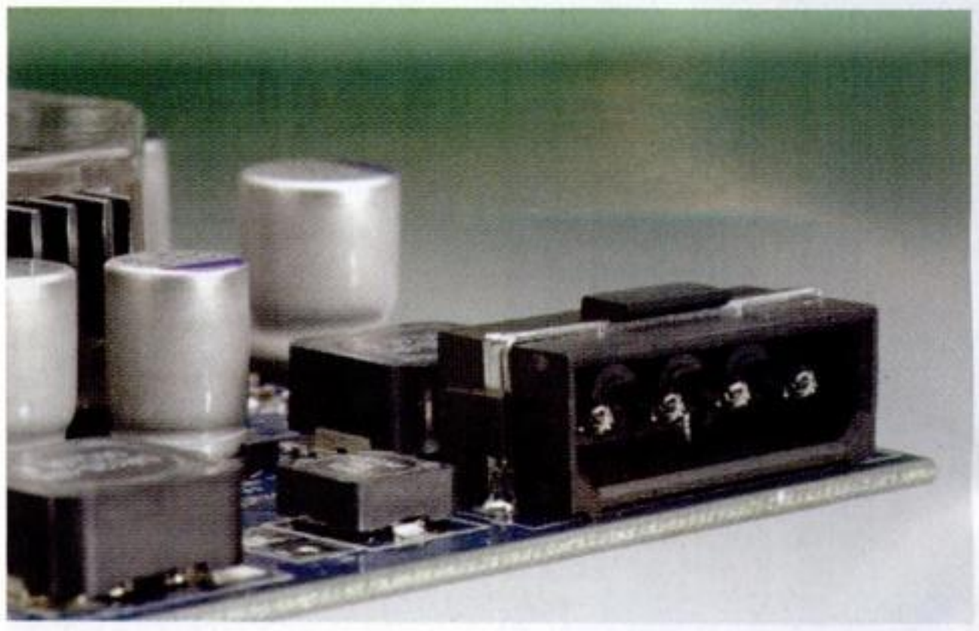
Now, let's get back to the software. We've been impressed by Ageia's demos. The *Cell Factor* demo demonstrates the PhysX chip's potential, but the game is so far from real that no one's signed up to publish it. Ignoring that minor detail, nearly everything in the game's environment is destructible; you can even manipulate pieces of objects you've already blown apart. And you need to be careful, lest a chunk of flying debris land on your head and kill you. This kept us entertained for about 10 minutes. Next?

We temporarily uninstalled the card and eagerly downloaded the demo version of *Ghost Recon: Advanced Warfighter* (the full game is bundled with the card), one of the first titles to support the PhysX chip out of the gate. We shot all our teammates and they realistically crumpled to the ground. When we shot their bodies to see what would happen, nothing did. We looked forward to installing the PhysX card and seeing the corpses blown into gibs of red goo; you know, like they did in Ageia's demos.

We shot up a car and watched sparks fly. We looked forward to installing the PhysX card and seeing bullet holes appear in the sheet metal; you know, like they did in Ageia's

GAMES SUPPORTING PHYSX

GAME	PUBLISHER
TOM CLANCY'S GHOST RECON: Advanced Warfighter	Ubisoft
RISE OF NATIONS: Rise of Legends (patch forthcoming)	Microsoft Games Studios
BET ON SOLDIER: Blood Sport	Take Two Interactive
CITY OF VILLAINS	NCSoft



Asus' card will not only consume a PCI slot, possibly displacing your soundcard, but it also requires supplemental power from the power supply.

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demos. We then lobbed a grenade at a car. Its windows disappeared, one of its doors flew open, and the tires fell off. We looked forward to installing the PhysX card and watching the car lift into the air from the force of the detonation, its windows and doors blasted into different sized bits, littering the ground and remaining persistent in the scene. Maybe the roof would blow off; you know, like objects did in Ageia's demos.

And then we reluctantly removed our X-Fi card, inserted the Asus PhysX card, relaunched *Advanced Warfighter,* and proceeded to execute our hapless teammates. They realistically crumpled to the ground, just like before, but there was no reaction whatsoever when we shot their bodies. The presence of the PhysX card had no impact at all. So we proceeded to vandalize the car again. This time, we watched *two* colors of sparks fly. OK, at least that was different. Surely chucking the grenade into the car would deliver the money shot. The car rose up about an inch, its windows shattered, one door blew open, the tires fell off, and a few chunks of debris littered the ground and rapidly disappeared. The force of the blast also bent over a light post. $300 for that?

Is this Ageia's fault, for over-hyping its product? Or is it the game developers' fault, for not utilizing the PhysX chip's true power? The answer is, it doesn't matter. Based on what we've seen so far, we can't recommend that anyone—no matter how much an enthusiast they might be—spend $300 and possibly give up their soundcard to buy this product. Ageia and its game-developer partners first need to bridge a yawning chasm between hype and reality. We're willing to evangelize the concept of physics acceleration, but it's too early to anoint any prophets.

—MICHAEL BROWN

There's no shortage of silicon on Asus' PhysX physics-accelerator card.

ASUS PHYSX P1/128MB

MONEY SHOT

Includes full version of *Tom Clancy's Ghost Recon: Advanced Warfighter.*

CHEAP SHOT

Too few games support the PhysX chip today; those that do don't take good advantage of it.

6

$300, www.asus.com

Overdrive Gemini GX2

Quad SLI, oh my!

We've seen plenty of white-box PC vendors slap on a coat of paint, double prices, and declare themselves to be "boutique," so we didn't expect much when mostly unknown Overdrive PC sent us its Gemini GX2 system. But the PC turns out to be surprisingly tasty.

Overdrive PC deserves to rub shoulders with the boutique vendor crowd.

Packed inside the custom painted case were nothing less than two nVidia's GeForce 7900 GX2 cards—quad SLI. Quad should have had its public debut in last month's *Maximum PC,* but a driver bug that distorted images on 30-inch flat panels delayed its release.

With driver bugs taken care of, the machine was finally shipped to us, which presented its own problems: The cards' weight bowed the rear of the aluminum case enough to cause them to pop out of their slots. Oy.

But after reseating the cards, and booting the machine, the Gemini GX2 proved its worth. Niceties include a custom overclocking section in the BIOS, and system screws with rubber grommets to dampen noise. The paint job isn't flashy, but it's high-quality work. And the door fans are especially impressive: Gone is the tangle of wires you typically confront when you remove the side door, because Overdrive uses a clever contact patch to deliver juice to the fans wirelessly.

Clean wiring and a trick to disconnect the side-door fans illustrate Overdrive's attention to detail.

Our box shipped with an Athlon 64 FX-60 overclocked to 3GHz—400MHz above stock and 200MHz above the other machines we've seen. Oddly, Overdrive stuck with a stock heatsink fan to keep the chip cool. In our climate-controlled Lab, we experienced no apparent overclocking issues, but we did experience two lockups in Adobe *Premiere Pro 2.0* and occasional shutdowns in both the overclocked and non-overclocked states. Because the lockups also occurred at stock clocks and went away after we restored the OS image on the machine, we suspect it was due to a software glitch brought on during benchmarking rather than overheating issues. We also had problems getting finicky-old *SYSmark* to run. We were unable to resolve it, but we suspect it to be a driver issue that only affects the benchmark and not actual applications.

Quad performance itself presents an interesting dilemma. In our standard benchmarks at 1600x1200, the cards are faster than SLI, but not by enough of a margin to justify the huge price premium. In fact, the difference is almost ho-hum. It isn't until you plug a quad configuration into a 30-inch panel that the technology shows its legs. At 2560x1600, the Gemini GX2 posted *3DMark2006* scores that were twice as fast as our zero-point system, which is equipped with two GeForce 7900 GTXs in SLI. That's damned fast. The problem, of course, is that you need a $2,000, 30-inch panel to reap the performance advantages. The problem is compounded by the fact that the lackluster response times of the current crop of 30-inch panels render them unfit for full-time gaming duties. What's more, there are precious-few games that actually support 2560x1600. But when it works, it's glorious.

We're not convinced that quad SLI is the best solution for faster frame rates—at least not in its current iteration and pricing—and there's really no reason to go quad unless you use a 30-inch panel.

—GORDON MAH UNG

UNDER THE HOOD

BRAINS	
CPU	AMD Athlon 64 FX-60 (3.0GHz dual core)
MOBO	ASUS A8N32-SLI Deluxe
RAM	2GB (DDR400)
LAN	Dual Gigabit LAN
HARD DRIVES	Two 150GB Raptors (10,000rpm SATA) in RAID 0 and one 500GB Seagate
OPTICAL	Sony DW-G120A
BEAUTY	
VIDEOCARD	Two nVidia GeForce 7900 GX2 (567MHz core, 660MHz RAM) in quad SLI
SOUNDCARD	Sound Blaster X-Fi Xtreme Music
CASE	Custom Lian Li
BOOT: 54 sec.	DOWN: 11 sec.

OVERDRIVE GEMINI GX2

FOUR STARS

Quad SLI and a raft of custom touches make the Gemini X2 a gem.

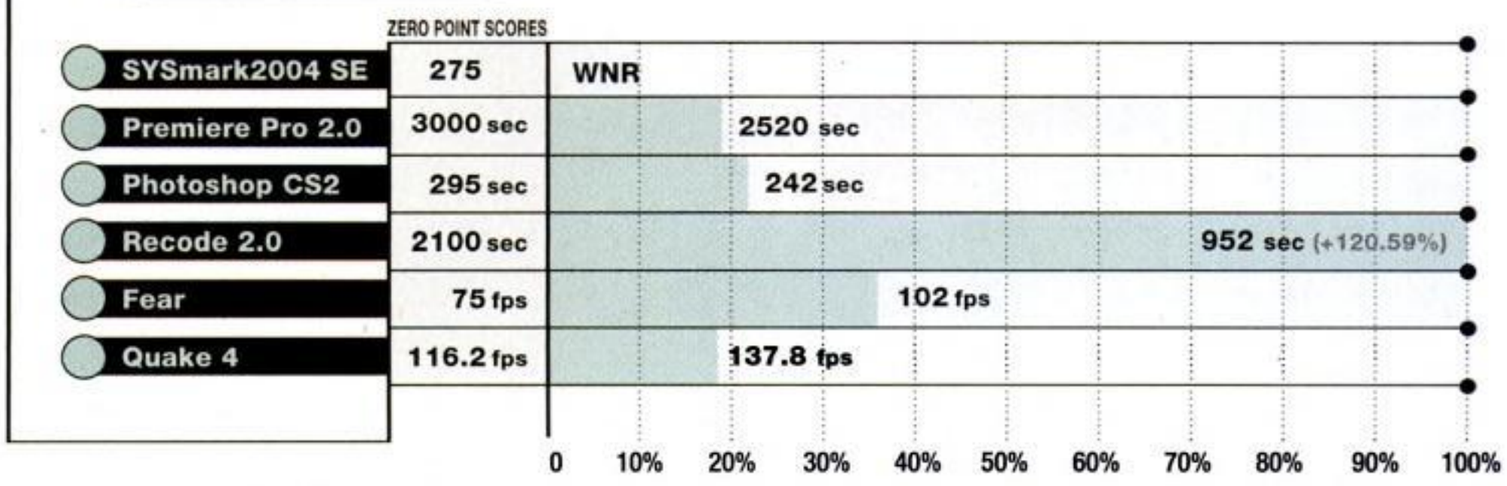
FOUR SCARS

Limited game support, minor glitches, and slow response time in the 30-inch LCDs hurt hi-res gaming.

7

$7,910, www.overdrivepc.com

BENCHMARKS



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ASUS Recommends Microsoft® Windows® XP

Maximum Effect
for a minimal price

A6Jc series notebooks

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- NVIDIA® GeForce® 7300 supports 256 Megabytes of TuboCaché video memory for the latest graphics-intensive games.
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intel Centrino® Duo

Dual-core. Do more.

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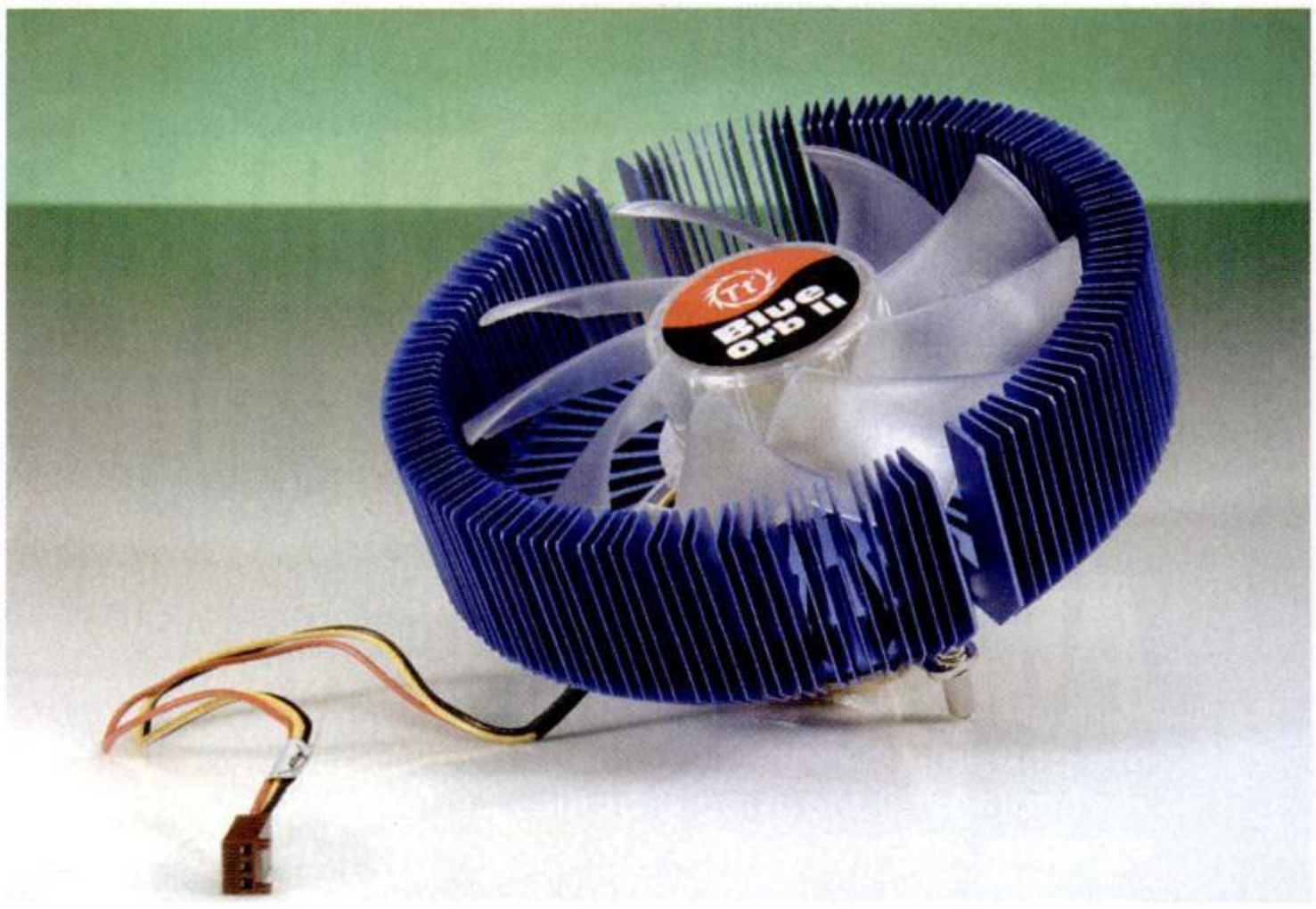
Cool Duel

Five CPU coolers fight to become the 'air' apparent

Replacing your CPU heatsink with an aftermarket unit is one of the best bang-for-the-buck upgrades around. For less than $50 you get additional cooling performance (and more headroom for overclocking), a bit of style and panache, and a touch more hardcore cred for your PC.

This month we test five new CPU heatsink/fan coolers (all are compatible with a wide range of late-model CPU sockets), and for comparison we retest our previous favorite air cooler—Zalman's CNPS9500 LED—as well as the reigning water-cooling champ—Swiftech's Apex Ultra—on our new test bed machine.

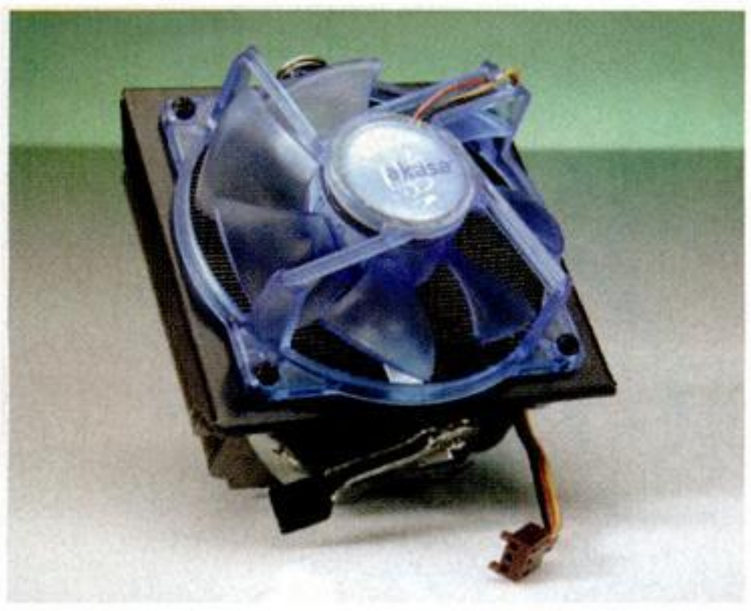
—JOSH NOREM



People will say the Blue Orb II is a ripoff of Zalman's design, but Thermaltake pioneered the "blooming flower" heatsink back in the day, with its original Golden Orb.

AKASA AK-873 AMD COOLER

The AMD-only AK-873 is small enough to fit comfortably in your palm, but its large copper base plate (zinc-coated to ward off corrosion) makes it surprisingly heavy. Two plump 8mm heat pipes carry the heat from the base plate to the upper area of the aluminum heatsink. From there an open-frame 8cm fan blows downward, moving heat away from the fins, and cooling the voltage regulator modules (VRMs) and MOSFETs around the CPU socket. This model also includes a fan-speed adjustment knob that you mount in a PCI slot.



Akasa's AK-873 is an AMD-only cooler that's easy to install, but its 8cm fan is way too loud.

At low speeds, the cooler runs very quiet, but at high speeds it's intolerably loud. Akasa says it pumps out 38dbA at full speed, moving 40CFM of air. Even when we enabled our motherboard's fan throttle to quiet it at idle, the fan still made a ruckus. Cooling performance was near the top of the charts at the fan's fastest setting, but it's simply too loud and high-pitched for us to recommend. Installation was easy, however, with no motherboard removal required.

THERMALTAKE BLUE ORB II

We gave the Golden Orb II a mediocre 7 verdict back in October 2005, but the Blue Orb II is bigger and much, much better. It's a massive cooler that squats over the CPU socket like a sumo wrestler, taking up every square millimeter of space. It features a standard copper base plate with aluminum fins that separate into a cool-looking forked pattern. A silent (17dbA) 12cm fan blows down on the fins, cooling the CPU and everything around it. Motherboard removal is only required for LGA775 sockets—poor Intel users.

During testing, the Blue Orb II performed on par with the reigning champ—Zalman's CNPS 9500 LED. The Orb is also incredibly quiet at all times. Our only gripe is that the cooler stretched out over the neighboring RAM slots, blocking our stick of extra-tall Corsair memory. A standard RAM stick fit just fine, however, as did memory with heat spreaders.

KINGWIN BIG AIR BA-12 FOR AMD

Kingwin's BA-12 shares a similar design with the popular Thermalright XP-120. A

AKASA AK-873 AMD COOLER

+ **FIN:** Easy to install and has an adjustable fan.
− **FANG:** Very loud at full speed; must reach behind PC to adjust fan speed.

7

$32, www.akasa.com.tw

THERMALTAKE BLUE ORB II

+ **COOLING:** Looks sexy, has awesome cooling performance, and is easy to install.
− **HEATING:** It's so big that it stretches out over the RAM slot, disallowing extra-tall RAM.

9

MAXIMUM PC KICKASS

$40, www.thermaltake.com

KINGWIN BIG AIR BA-12 FOR AMD

+ **FAN:** Very quiet, easy to install, cools entire CPU socket area, and has pretty blue LEDs.
− **STALKER:** Respectable performance, but not up to par with the best coolers.

8

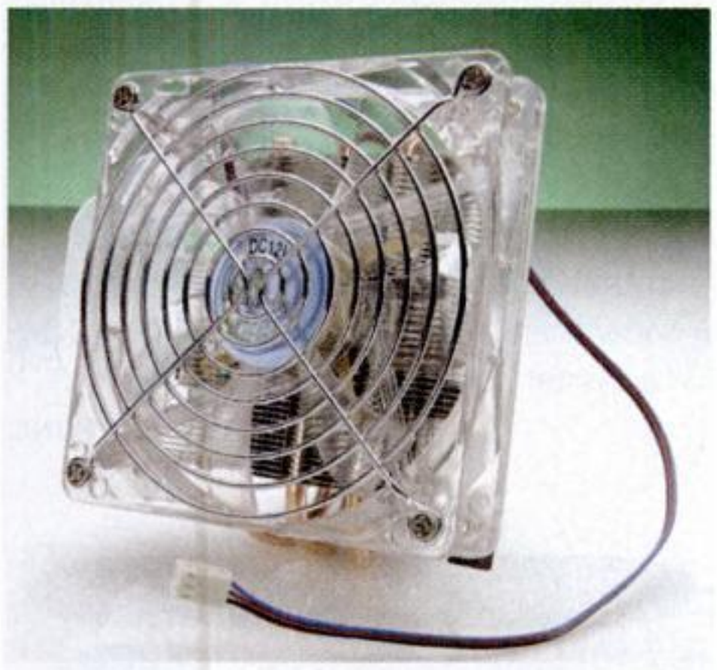
$40, www.kingwin.com

Copyrighted material

copper base plate connects to an aluminum heatsink, which is aligned parallel to the motherboard. A 12cm fan blows air over the heatsink, cooling the fins and also all the components around the CPU socket. The downward-facing fan works very well on our A8N32 motherboard, which uses a heat pipe to transfer heat away from the chipset. The heat pipe ends in a small copper heatsink near the CPU, which is cooled by runoff airflow from the CPU cooler.

Installation is practically effortless. The heatsink uses the standard AMD retention mechanism, with a snap-on three-hole clamp. The cool thing (no pun intended) is that the 12cm fan snaps onto the heatsink via a spring-loaded clamp. It's a simple design that makes installation of the cooler and fan much easier.

Unfortunately, the BA-12 posted temperatures that were slightly higher than the other coolers. We blame the heatsink's relatively small size. Its 2,000rpm fan ran quiet, and sports nifty blue LEDs, but it doesn't keep the sink as cool as we'd like.



Usually heatsinks that rest parallel to the mobo and have huge fans on top are a pain to mount. Kingwin gets around the hassle by having you mount the heatsink and fan separately.

AKUATEK EXTREME FS92

Though the Akuatek looks like a run-of-the-mill heatsink/fan setup, it's actually a water-cooler in the same vein as Cooler Master's Aquagate Mini. The heatsink comes prefilled with water, which circulates throughout the device, aiding in cooling. The problem, as you might have already surmised, is that there isn't much water in a unit that lacks a reservoir and tubing. Though such a design simplifies installation, it hurts performance, making this cooler more of a downgrade than an upgrade.

It might look just like a garden variety heatsink/fan, but the Akuatek is actually a water-cooler.

Easily the most egregious feature of the Aquatek is that it's secured to the CPU socket from underneath the mobo, for Socket 939 and LGA775. Screw that! We can't remember the last time we had to remove the mobo to install a Socket 939 cooler.

Once installed, the Extreme FS92 cools just as well as the stock cooler, but it's louder. There's nothing interesting or compelling to see here. Move along please.

SCYTHE NINJAPLUS

The Scythe Ninja Plus is a huge-ass cooler, but it's surprisingly light. Hugeness usually equals goodness when it comes to heatsinks—more surface area means more cooling power, which the Ninja delivers. The Ninja sports a copper base plate, six copper heat pipes, and aluminum fins that look a little like ninja throwing stars, if you squint. You can theoretically attach the included 12cm fan to any side of the cooler, but its huge size (both the heatsink and the fan are massive) forced us to mount the fan blowing up toward the power supply. It's not an ideal orientation, but it sufficiently cooled the CPU and components around the CPU socket.

The Ninja Plus is incredibly light despite its towering size. The included fan spins at 1,200rpm, moving 45CFM of air.

Installation doesn't require mobo removal for AMD boards, but it does for LGA775. With the provided retention module in place on either platform, you'll simply push four tabs down to lock the cooler in place.

During testing, the Ninja's performance was right in the thick of things. It didn't turn in the best scores, but it's very close, and impressively quiet. Scythe claims the Ninja runs around 23dbA, which sounds about right to us.

It takes up a lot of space, but top-of-the-line qualities make the Ninja highly desirable.

AKUATEK EXTREME FS92

+ AQUA
Interesting design; smallest water-cooler we've seen.

− MUERTE
Must screw the device into the underside of the mobo; lackluster performance; noisy.

4

$60, www.akuatek.de

SCYTHE NINJA PLUS

+ NINJA
Silent, chilly, and easy to install.

− PIRATE
Humongous footprint.

9

$50, www.scythe-usa.com

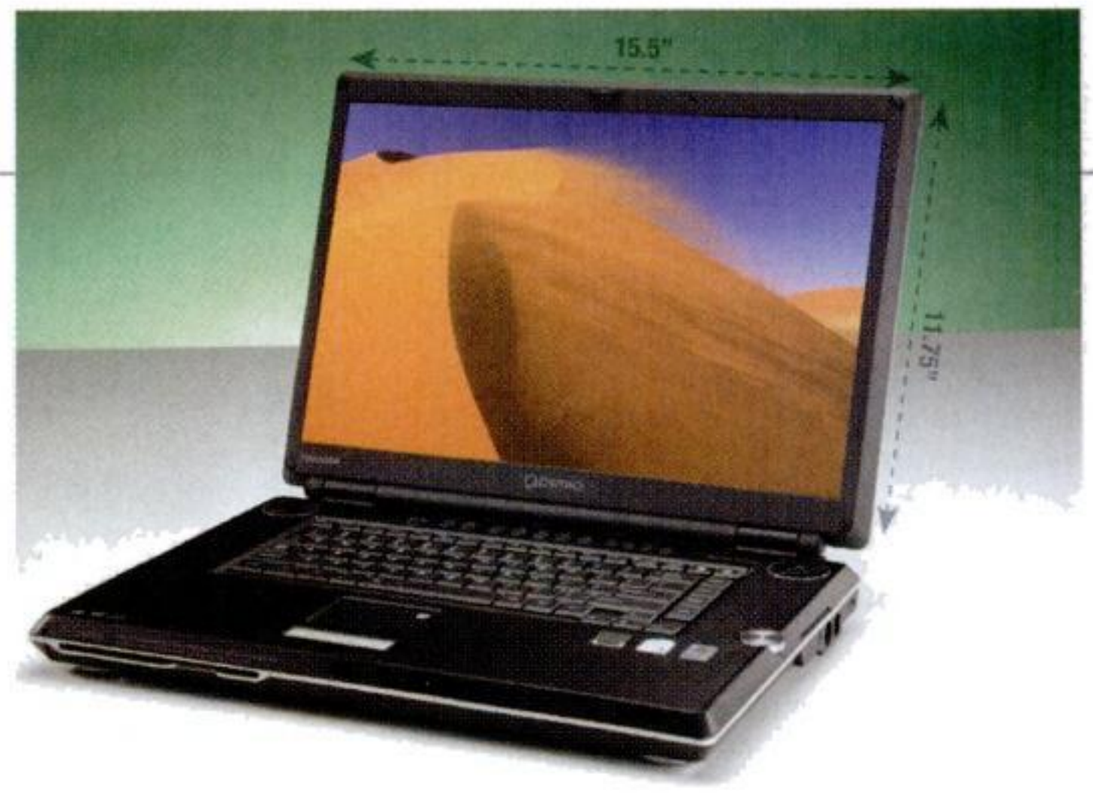
BENCHMARKS

	BLUE ORB II	AKASA AK-873	SCYTHE NINJA PLUS	AKUATEK	KINGWIN BA-12	ZALMAN 9500	SWIFTECH APEX ULTRA (WATER)	STOCK COOLER
IDLE (C)	40	40	43	43	45	**39**	29	44
100% LOAD (C)	47	49	50	51	54	**46**	36	53

Best scores are bolded. All temperatures were measured via the onboard sensors, using the utilities provided by the motherboard manufacturer. Idle temperatures were measured after 30 minutes of inactivity and full-load temps were achieved running CPU Burn-in for one hour.

Toshiba Qosmio G35-AV600

A screen so bright and brilliant, you need to wear shades



A big, beautiful beast, the Tosh's main weakness is its graphics performance.

Monster notebooks skew two ways these days: They're either gaming-friendly, desktop-replacement machines that breathe fire, or they're big-ass Media Center jobbies.

We haven't yet seen a Toshiba notebook that's competitive in gaming performance, but the latest Qosmio (pronounced Cosmio) just might be the best Media Center notebook we've seen to date.

Most notebook vendors just take an existing large-screen notebook, install Windows Media Center Edition, bundle a USB TV tuner, and call it a day. It seems like Toshiba actually designed the G35-AV600 from the ground up as a portable device meant for entertainment.

The best example of that attention to detail is the Ultimate TruBrite screen, which is rated at 480 nits, a measurement of a screen's brightness. Most notebook screens hover around the 200 nits range, while the average desktop monitor rings in around 250 nits. So believe it when we say the G35's screen is freakin' bright. It's technically on par with large-screen LCD TVs, and it looks simply stunning, putting other notebook screens to shame.

The G35 also features something we've wanted for a very long time from notebook vendors: a slot-fed optical drive. Granted, the stand-out skill of this Panasonic drive (the same one used in Macintosh notebooks) is lightning-fast DVD-RAM burns, so it's not *that* exciting.

The G35 includes both PC Card and ExpressCard slots. We dinged Dell for jettisoning the PC Card slot in its E1705, and reader feedback backs us up. PC builders need to realize that there are just too many people out there with PC Cards to be ignored. They wouldn't drop PCI from a desktop machine, would they?

Not to rant against Dell's E1705, but while that machine used a bulky USB tuner, Toshiba integrates an analog TV tuner into its case. Of course, there's no HDTV support, but that's an issue that vexes all mobile MCEs. Toshiba is also one the few notebook makers to still include a built-in volume knob. In the G35, Toshiba went all out with a classy, solid-aluminum dial. Oddly, while the knob changes volumes in MCE2005, it doesn't work within Windows XP itself.

For storage, Toshiba equips the G35 with not one, but two hard drives. The drives offer 80GB apiece, which is a little underwhelming. In an unusual move, Toshiba has the drives configured separately but you can enable mirroring to protect your data on the fly. That's pretty valuable if you use your notebook to store critical data such as digital pictures, but it would be far more useful if the drives were larger.

So where does the G35 fall down? In performance, of course. For some reason, Toshiba has never decked out its units with the hottest parts available. The GeForce Go 7300 GS can barely run the two-year-old *Doom 3* benchmark at 1280x1024 with 4xAA enabled. Toshiba also uses an Intel Core Duo T2400, which is about 300MHz slower than Intel's fastest. While the Intel 945PM chipset supports DDR2/667, Toshiba opted for DDR2/533. This all adds up to benchmarks that are out of the hunt when compared with current high-end notebooks. The G35's performance isn't horrible; in fact, in application testing it runs slightly better than our zero-point system—a year-old Dell XPS with GeForce 6800 graphics and a single-core Pentium M.

It comes down to what you want from your notebook. There are clearly better general-purpose notebooks available for gaming, productivity, and pixel crunching. The G35 is not without merits, though. It's configured with optional RAID 1, an onboard TV tuner, a biometric fingerprint reader, and a super-bright screen. We think there are certainly improvements to be made (especially in the 3D department), but the G35 is easily the best Media Center notebook we've tested.

—GORDON MAH UNG

UNDER THE HOOD

BRAINS	
CPU	1.83GHz Intel Core Duo T2400 (using Intel 945PM chipset)
RAM	1GB DDR2/533
LAN	802.11 b/g/a, Gigabit, Bluetooth, V.92 modem
HARD DRIVES	Two Toshiba 80GB MK8032GSX, 5,400rpm, SATA
OPTICAL	Panasonic UJ-846S

BEAUTY	
VIDEO	nVidia GeForce 7300 GS
DISPLAY	17-inch (1440x900@32-bit)
AUDIO CHIP	Sigmatel HD Audio
LAP WEIGHT	10 lbs
CARRY WEIGHT	11 lbs, 3 oz

BOOT: 51 sec. DOWN: 27 sec.

TOSHIBA QOSMIO G35-AV600

STARFLEET

Brilliant screen, RAID 1, nVidia PureVideo, and a slot drive!

STARFORCE

Second-rate CPU, RAM, and GPU put it behind the competition in performance.

9

$2,400, www.toshiba.com

BENCHMARKS

	ZERO POINT SCORES	
Premiere Pro	686 sec	595
Photoshop CS	394 sec	407 (-3.19%)
HD Tach	27.6 MB/s	27.7
Doom 3	49.1 fps	25 (-49.08%)
3DMark 05	4,889	1682 (-65.60%)
Portable Gaming	92 min	75 (-18.48%)

0 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

Our zero point is a Dell Inspiron XPS, with a 2.13GHz Pentium M, 1GB of DDR2/533 RAM, and a GeForce Go 6800 Ultra.

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Sonos Digital Music System: ZP-80 Bundle

Warning: Product known to induce uncontrollable drooling

The ZP-80 bundle consists of two Zone Players and one controller. The wireless network can be expanded to 32 zones using ZP-80s ($350 each), ZP-100s ($500 each), and Sonos controllers ($400 each).

If Slim Devices' Squeezebox is the Volkswagen of audio-streaming devices, Sonos' Digital Music System is the category's Mercedes. But when we consider a high-end product with a price tag more than 3x its competition, we have to ask: Is the luxury worth the price?

We bestowed Sonos' $1,200 ZP-100 bundle with a 9 Kick Ass verdict in April 2005, so we beamed with anticipation when Sonos told us they designed the new ZP-80 to counter two of our earlier criticisms: They excised the integrated amp (we dismissed it as underpowered and unnecessary), and they added digital outputs (TOSLink and coax).

But we turned incredulous when we heard that a ZP-80 bundle would cost a cool grand—a relatively insignificant price drop. Those negative vibes evaporated, however, after we spent just 10 minutes installing the system. And we grinned the grin of the dyed-in-the-wool geek the instant we used that scrum-diddily-umptious controller: Its magical motion detector activated the moment we picked it up, the touch-sensitive scroll wheel positively jumps, the light sensor illuminated the buttons in the darkened room, and that gorgeous 3.5-inch color LCD sprang to life. Yes, this luxury is worth the price—especially when compared to multi-zone control panels from Crestron and AMX. Besides, the ZP-80 sounds absolutely divine.

Sonos' systems utilize self-contained, wireless, AES-encrypted, mesh networks. As such, they not only leave no footprint on your wireless LAN, but they also deliver incredible range: If one Zone Player is too far from the one hardwired to your router, those within range will behave like a digital bucket brigade, playing the packets addressed to them and passing along the others until they reach their intended destination.

The drawback to this design is that the first Zone Player you install must be hardwired to your router. Unless you have Ethernet to a stereo, that unit is essentially wasted. (It'll play your music, but that's redundant because your PC can do the same thing.) But this shortcoming is mitigated by the fact that the network can expanded to a maximum of 32 zones, using either ZP-80 or ZP-100 players and multiple controllers. Salivate at will.

—MICHAEL BROWN

SONOS ZP-80 BUNDLE **9**

$1,000, www.sonos.com

MAXIMUM PC KICKASS

GigaWorks ProGamer G550W

Creative's best gaming speakers go wireless

Creative's GigaWorks G550W is for people who absolutely, positively cannot run wires from their sub to their rear channels.

Creative cut the cord on the rear channels of its GigaWorks ProGamer G500, added a wireless remote control, and rechristened the 5.1-channel speaker system the G550W. It's a convenient solution, but it left our ears craving something better.

Transmitting audio without wires is a challenge, and Creative's engineers deserve high marks for nearly eliminating much of the noisy hiss in this system's rear channels. They're much quieter than the Logitech Z-5450 system we reviewed in January; but to an audio purist, any amount of hiss sounds like fingernails on a chalkboard.

The G550W, like the Z-5450, isn't truly wireless for the simple reason that no one's figured out how to transmit electrical power through the air. But Creative's system requires only one power outlet, for a box that houses the rear-channel amplifier and the wireless receiver. And because speaker cables are thinner than grounded power cables, Creative's wiring is much easier to camouflage. (Actually, "thin" is a bit of an understatement: the cheap speaker wire provided is about as substantial as the hair on a Barbie doll.)

SPECS

SATELLITE SPEAKERS	3-inch paper cone drivers; plastic cabinets
SATELLITE POWER	36 watts per channel
SUBWOOFER	8-inch long-throw driver; MDF cabinet
SUBWOOFER POWER	130 watts
SIGNAL-TO-NOISE RATIO	85dB; 0.1% THD

A module with an awkward top-mounted knob regulates volume (with independent control for the center and rear channels), bass, and treble. It also harbors a headphone output (or you can use selected Creative wireless headphones models) and a line-level input (handy for an MP3 player). This controller is tethered to the subwoofer, but Creative also throws in a wireless remote that's compatible with selected Creative MP3 players.

Aside from the almost imperceptible hiss in the rear channels, the G550W sounds very good; the fat-sounding sub is particularly tasty. It's both superior to and $100 cheaper than the Z-5450 (Logitech includes a built-in surround-sound decoder, which is redundant in a modern PC environment); but it's a far cry from our favorite surround-sound speakers: the recently discontinued M-Audio LX4 system.

—MICHAEL BROWN

PROGAMER G550W **8**

$400, www.creative.com

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Logitech Wireless Music System for PC

What's good for the goose isn't great for the gander

Logitech's Wireless Music System for iPod? Terrific! Logitech's Wireless Music System for PC? Not so hot.

Logitech's Wireless Music System for PC uses the same basic technology as the company's Wireless Music System for iPod we reviewed in July, but we're not nearly as fond of it. It's not a horrible audio-streaming solution, but it's certainly not a great one.

The fact that the Wireless Music System sells for half the price of our perennial favorite low-end streaming box—Slim Devices' Squeezebox—is a plus, but that extra buck-fifty delivers a raft of features you won't find in Logitech's solution, including a gorgeous fluorescent display, push-button access to Internet radio stations, the easy-breezy *SlimServer* software, superior range, digital outputs, and far better audio quality.

The absence of a display doesn't impact Logitech's iPod version because your MP3 player serves as a display. With the PC version, remote interaction with your music player is limited to blindly moving between queued tracks, pausing, muting, and controlling volume. By the same token, Bluetooth's limited range is a much bigger problem with the PC version because you can't easily move your desktop PC if it's outside the device's 33-foot range. The Chiclet-size remote control, seems destined to disappear forever into the depths of your couch cushions.

Logitech's *MusicAnywhere* software captures and redirects your media player's audio output from your PC's sound system to its USB port, which means you can't play music on your PC's speakers and stream it to the Bluetooth receiver in another room at the same time. Each time you *do* want to listen to music on your PC, you'll need to reconfigure *MusicAnywhere* accordingly. Frustration levels will rise higher for *iTunes* users: That program doesn't allow you to select which device plays its music, so you're forced to choose *MusicAnywhere* as your default audio device—and that means every bleep and bloop your PC generates gets streamed to your hi-fi system.

If you can live with all these limitations, and you're working with a very tight budget, we've listened to worse solutions. But doesn't your music deserve better?

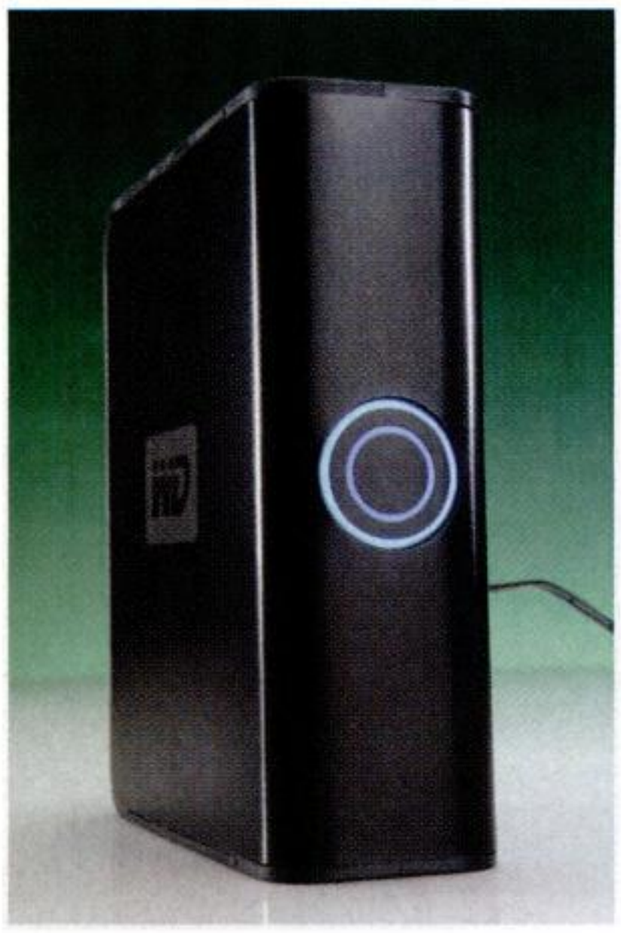
—MICHAEL BROWN

LOGITECH WIRELESS MUSIC **6**

$150, www.logitech.com

Western Digital My Book PE 500GB

Totally idiot-proof, but slightly lacking



WD's new My Book backup drive is simple to use and surprisingly elegant. The glowing blue circles indicate drive activity (outer circle) and free space on the drive (inner circle).

Most people don't keep up with the backup drive game, and we don't blame them. It's about as exciting as a "You'll never believe what happened to me last night in *Oblivion*" story. The Cliff Notes overview is that WD's Dual-Option Media Center drive has ruled the roost for a long time. We loved its high capacity and somewhat-easy-to-use software, but what really set it apart from the competition was its front-mounted USB port and 8-in-1 media reader. Apparently no one else loved it, though, because WD has ditched those amenities with its totally redesigned My Book: a book-shaped backup drive that delivers on its promises, but still can't compare with its predecessor.

We tested the 500GB Premium Edition of the My Book, though it's also available in smaller capacities. All Premium Edition drives offer two six-pin FireWire 400 ports, a USB 2.0 connector, a capacity gauge (the inner blue ring on the front of the drive), and WD's backup software. A WD5000KS drive, aka WD Caviar SE 16, handles storage duties. It's WD's fastest 7,200rpm drive (and our favorite drive in this category), and it sports a 16MB buffer.

On the software side, WD has thankfully ditched the somewhat-arcane Dantz *Retrospect* in favor of backup software from Arcsoft that has a custom-designed and totally newb-proof front end. You can select specific folders for backup, or simply select "photos," "videos," or "music," and it'll scan your drive for the relevant file types and back them all up. You can schedule backups, password-protect individual backups, and quickly restore files by running the built-in restore program that *Retrospect* automatically attaches to each backup set. Nearly silent operation is the watchword for this drive; it even turns on and off automatically based on activity.

Our only complaint is that *Retrospect* lacks an option to save files in their initial format. Instead, it puts the files into compressed backup sets that you have to unlock using an included utility. It works perfectly, but we'd like the option to make one-to-one backups, so we could browse the backed-up files using Windows Explorer. With a front-mounted USB port and media reader this drive could have surpassed the previous WD backup drives. As is, it's still a strong contender.

—JOSH NOREM

WD MY BOOK **8**

$350, www.wdc.com

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L23-7076 Z-5450 Digital Speakers $349.99

USB VIDEO

Tritton SEE2 USB 2.0-to-SVGA Adapter

There are some things that just shouldn't be attempted: SATA ISA adapters and x16 PCI-E modems, for example. To that list, we add the USB 2.0-to-SVGA adapter! No fooling, someone has made a graphics adapter that plugs into your USB 2.0 port.

We had the adapter up and running on our zero-point system in a couple of minutes. What we could do with it, however, is limited by the low 480Mb/s bandwidth of USB 2.0. Displaying a web page or static image worked fine, but trying to run video of any quality was impossible. The device let us run up to 1024x768 resolution, but only at 16-bit—32-bit sucked too much bandwidth. At lower resolutions, the adapter performed a little better, but not great. When a window is moved around the desktop, the card redraws it at speeds just slightly better than a graphics card without drivers.

The actual utility for this device is difficult to fathom. Modern PCs support a minimum of two monitors, as do most notebooks. Dual-card rigs can run up to four monitors. So adding an additional, non-accelerated screen that really shouldn't be running a resolution higher than 800x600 is kinda goofy.

Does that make it useless? Not quite. We actually found a couple of handy functions. Because SLI takes over both cards during 3D gaming, the adapter allows us to run a second monitor to watch our CPU utilization or temperatures. And folks looking for an easy way to power a small LCD mounted in the front of a case can use the USB adapter to power the graphics. Besides those specific instances, however, the USB to VGA adapter isn't too useful.

—GORDON MAH UNG

SEE2 ADAPTER **5**

$78, www.trittontechnologies.com

AUDIO GIZMO

Musketeer III Tube Pre-Amp

One geek's must-have gadget is another geek's over-the-top gimmick. Where CoolerMaster's Musketeer III will land on *your* scale depends on whether you listen to digital music or are stickin' with your turntable and vinyl.

The Musketeer III is a vacuum-tube-powered pre-amp. That's right, we said "vacuum tube." This antiquated technology holds tremendous appeal for many audiophiles and musicians, who claim it lends perceptible warmth to music. It's impossible to empirically measure such a nebulous quality, of course, but our ears had a difficult time discerning any tangible difference with the Musketeer III in and out of the signal path. One thing we did notice was a minor drop in volume level, which is a little odd because a pre-amp should slightly boost an audio signal, not cut it.

The box mounts in an exposed 5.25-inch drive bay, drawing its power from the PC's PSU, and a set of internal input and output cables reaches back to a bracket on the PC's backplane. Using the supplied pigtail cable, you pipe your soundcard's output to the Musketeer's input, so that the audio passes through the pre-amp and out to self-powered speakers connected to its output.

From a purely aesthetic perspective, the Musketeer III lends a retro flair to your case; in fact, that's the single aspect we found appealing. There's just nothing like the soft orange glow of an authentic vacuum tube and a twitchy backlit analog VU meter, especially when they're mounted in the front of a case can use the USB adapter to power the graphics. Besides those specific instances, however, the USB to VGA adapter isn't too useful.

—MICHAEL BROWN

MUSKETEER III **6**

$70, www.coolermaster.com

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Sprint PC-5740 EVDO card

Check your email while sitting at the beach

Sprint's almost-affordable EVDO service and PC-5740 card puts an end to your hunt for Wi-Fi hotspots.

If you're the kind of road warrior who has spent an hour driving around aimlessly looking for an unsecured wireless router to check your email, it might be time to invest in EVDO service.

EVDO, which stands for *evolution data optimized*, offers "broadband-like" speeds using the CDMA mobile phone network. Such technology has been available for some time but never at the affordable prices it is today. Sprint's Mobile Broadband package is available two ways: $40 for 40MB of usage and one-tenth of a cent per additional kilobyte, or all you can eat for $60 (provided you have a voice account with Sprint.)

Sprint claims the largest market coverage with 212 markets and 481 airports, but like any wireless service, your mileage will vary greatly. We conducted our testing in the San Francisco Bay Area and had no connectivity problems using Sprint's EVDO service and the company's new PC-5740 PC Card made by UTStarcom. The card is the cheapest Sprint offers at $230, but the company shaves off $150 when you sign up for a two-year plan. The PC-5740 features an integrated fixed antenna, but there's no support for an external antenna. Folks who have newer notebooks that feature only ExpressCard slots are out of luck right now.

Just plug the PC-5740 into a PC Card slot, activate the card, and you're ready to hit the Internet anywhere there's coverage. Of course, the "broadband-like" descriptor used by both Sprint and Verizon (the two largest EVDO vendors) set off some alarm bells. Sort of the way your whiskers would twitch hearing the phrases "meat-like," "almost like butter," and "pretty-much fresh."

In practice, however, we found the data throughput to perform as well as cheap broadband. That is, we saw speeds competitive with 1.5Mb/s DSL packages (we're talking 100Kb/s real-world downloads). Not bad, but we were a little relieved to get home and back on our 3Mb/s DSL line. Sprint rates EVDO at 400kb/s to 2Mb/s with reception being an important factor in speeds. We never saw 2Mb/s, in our tests, and even if we did, we wouldn't be inclined to replace our hard-wired broadband with wireless.

But road warriors who have no problem shelling out cash for hotspot fees at Starbucks and airports will find Sprint's EVDO to be a better and probably cheaper alternative. And we have to admit, it's pretty nifty to stand in the middle of a park and access the Internet.

—GORDON MAH UNG

SPRINT PC-5740 EVDO **9**

$80, (plus a $60 a month for service with contract)

Magix Movie Edit Pro 11

Would you like a side of cheese with your video?

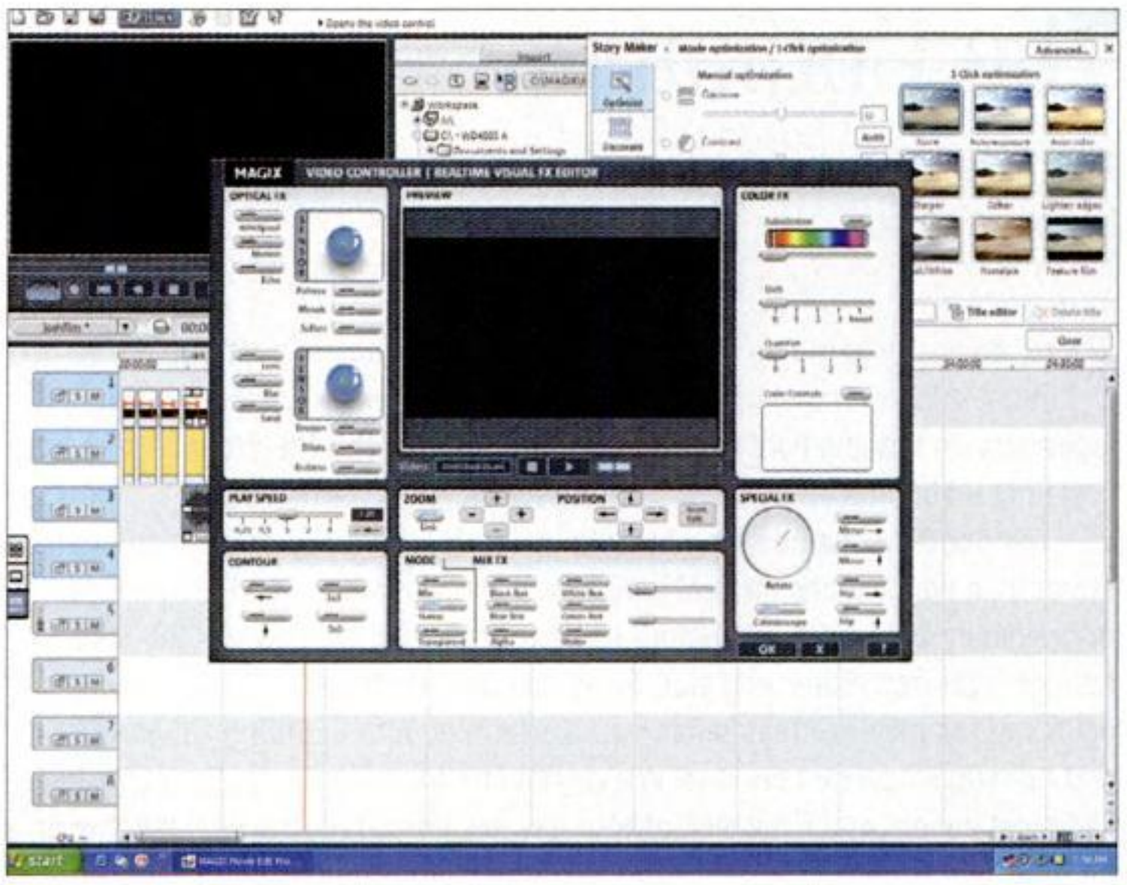
When watching home movies growing up, who didn't wish that Uncle Doug could have trimmed the boring sections from his reel and snazzed it up a bit with titles and effects.

Well, Uncle Doug, we've found your tool: *Magix Movie Edit Pro 11* is affordable, fairly powerful, and contains enough cheese-filled effects and transitions that we had to check the box to see if the developers were from Wisconsin. Our dairy favorite? The ability to overlay animated objects that look like leftovers from an episode of *Blind Date.*

OK, we're being a little hard on *Movie Edit Pro 11.* For a $60 program, you do get an awful lot of functionality, and not all of it is sharp cheddar. In fact, we'd rate some of the transitions and effects higher than those included with more upscale editing packages from Adobe and Pinnacle. The on-the-fly audio and easy to use color correction deliver functionality not present in other packages. Although Movie Edit Pro claims to support writing "HD discs," it's only in the poorly-supported WMV HD format, not true Blu-ray or HD-DVD formats.

Editing high-def camcorder footage was painfully slow on our Athlon 64 FX-60 system. Simply rearranging footage left the system noticeably pokey. The timeline editor obscured basic tasks such as splicing scenes and trimming footage. We didn't find the editing interface to be as intuitive as Pinnacle's or Adobe's consumer video editors. The title editor qualifies as bare-bones—without a wide color palette or font selection.

But the truth is that most people who use *Movie Edit Pro 11* will never shift into timeline mode. They'll just add the pre-fab transitions and effects, then click the burn button. For Uncle Doug, who just wants to add a Viking hat to a character or two, and maybe add some color and shake correction, *Magix Movie Edit Pro 11* offers more than enough power and is a hell of a deal too.



***Movie Edit Pro 11* has more than enough star wipes and other effects to keep even Homer Simpson happy.**

—GORDON MAH UNG

MAGIX MOVIE EDIT PRO **8**

$60, www.magix.com

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Imagenomic Noiseware Pro

The fastest image-noise removal in the industry? We'll see

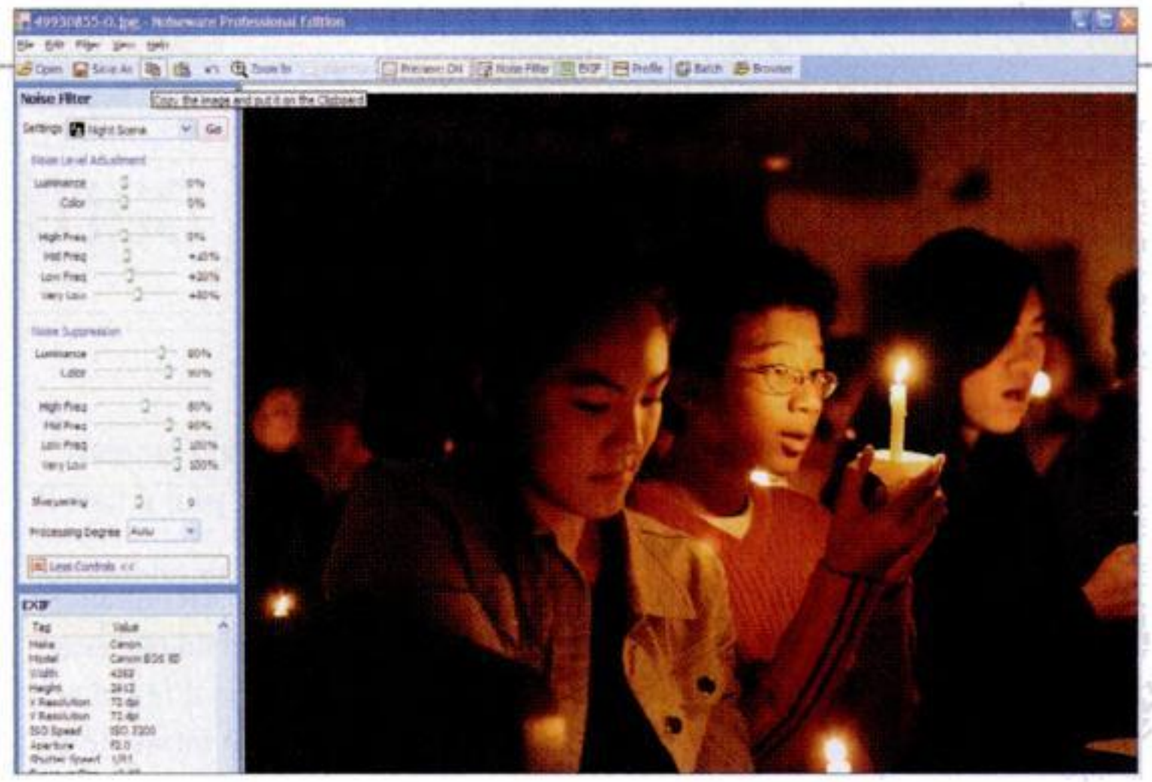
Performance computing certainly matters when it comes to editing high-res digital images. Second perhaps to digital RAW conversion in time-suckiness is the job of noise removal. Picking out pesky grains of noise from a picture is an insanely processor-intensive task, which takes a ton of time.

Imagenomic's *Noiseware Professional Edition* promises to be the company's fastest version yet. Fresh off the multithreaded high we got from PictureCode's *Noise Ninja* in April, we had lofty expectations of *Noiseware*.

To test the relative speed of the two products, we tasked both with removing image noise from a stack of 215 JPEGs shot with a Canon 20D at 1600 ISO. We used both an Athlon 64 FX-60 and a 3.46GHz Pentium 955 Extreme Edition PC for our tests. Both machines had 1GB of RAM in dual-channel mode and a 74GB Western Digital Raptor drive. On the Pentium Extreme Edition, *Noiseware* just barely edged out *Noise Ninja,* finishing our batch process in 20 minutes—about a minute faster than Ninja.

Things got more interesting on the Athlon 64 FX-60. While *Noise Ninja* was slower by just a minute on the Pentium Extreme, *Noiseware* was a full seven minutes slower on the FX-60 PC. The app is still fast, but *Ninja* obviously eats it up on Athlon 64.

For quality comparisons, we tasked both apps with cleaning up a candle-lit JPEG image shot at 3200 ISO. Here the two offered comparable results. Indeed we couldn't say definitively which one produced better improvements—the results for both were pretty stunning. But *Noiseware* gets the nod for its user interface.



On Intel processors, *Noiseware's* performance can't be beat.

Noise Ninja's cornucopia of switches gets a little overwhelming — it's a like being dropped into the cockpit of the space shuttle. It's harder to get lost in *Noiseware.*

Of course, the best part of *Noiseware* is that you can use the "community" version for free. The community version doesn't let you save your output to TIF files, but it does give you basic noise-removal and JPEG support. The professional, stand-alone version of the program costs $49 and supports 16-bit TIF images. The program is also available as a bundle with the stand-alone app and the *Photoshop* plugin for $79.

Our only major ding against the program is its slower performance on Athlon 64 processors and the lack of prebuilt profiles for existing digital cameras.

—GORDON MAH UNG

NOISEWARE **9**

$50, www.imagenomic.com

The Godfather

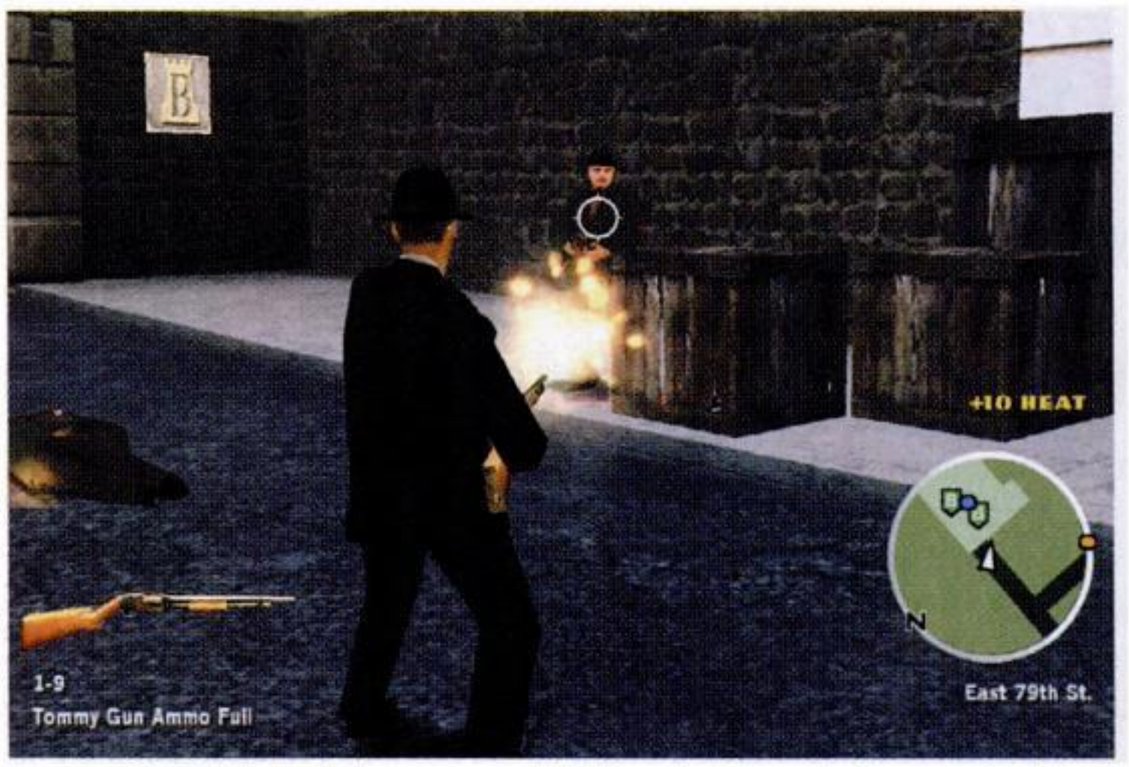
This game doesn't pull any punches, but it leaves your knuckles bloody

How does any game do justice when paying homage to a cinematic masterpiece? The simple answer is, it can't, especially with a movie as legendary as Francis Ford Coppola's *The Godfather*. But the attempt here is certainly ambitious.

***The Godfather* game sets you up in the Corleone Family as an adopted street thug who watched a rival gang gun down his father. Don Corleone, as portrayed by Marlon Brando before he death makes sure you learn the ins and outs of organized crime, and you slowly rise through the Mafia ranks while the events of the movie unfold before you. Performing hits, extorting shopkeepers,** and running illegal rackets is all in a day's work for a low-level Mob goon, but like most people, you'll get sick of your day job. Intimidating a local butcher or barber by smacking him around is novel the first dozen times, but these tasks become monotonous all too quickly. We'll give props, however, to the context-sensitive mouse-based combat controls, which make it simple to toss people through windows and smash their skulls into concrete.

What kept us playing was the game's main storyline, which draws from both *The Godfather* movie and book. Watching classic movie moments replayed in a game is surreal, especially when your character takes part in the action. We felt attached to these characters not only because we recognized them from the movie, but because they now had a stake in our character's in-game development. Convincing voice-acting and animation work only add to the immersion.

But once the main story ends, so does the fun. One of the game's heavily



***The Godfather* game pays homage to the legendary book and movie, while also making mob life seem kind of dull. It's an offer you just might want to refuse.**

touted features is the ability to orchestrate organized crime in all of New York, but this daunting task is both boring and unrewarding. You never really feel motivated to own a city that's painted with an overly brown palette and filled with hollow and sycophantic NPCs. *The Godfather* succeeds where it counts—bringing the compelling movie experience into your hands. It falls short, however, of transcending other *GTA* clones—remaining just another crime simulator.

—NORMAN CHAN

THE GODFATHER **7**

$40, www.godfathergame.com, ESRB: M

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The Elder Scrolls IV: Oblivion

The single-player MMO for just about everyone

Cyrodill is beautiful, for sure, but it does get a bit lonely: A co-op mode would have earned this game a 10 verdict.

Driving to work, I spied one of those "I'd rather be..." bumper-stickers, and in this particular driver's case the activity was "golfing." I immediately said to myself—out loud, no less—"Yeah, well I'd rather be playing *Oblivion*!"

It was a beautiful day (the first rainless day in what felt like months), and if I could have, I would have chosen to spend it *all* inside, seated at my computer with the shades tightly drawn, the sound cranked up, and the phone turned off. *Oblivion* is one of those rare titles that you think about when you're not playing it.

I would like to say that *Oblivion* is a better game than *Half-Life 2*, but that would be comparing apples to oranges. What I can safely say, however, is that *Oblivion* is a much, much—*much*—bigger game. This game is so big that the main quest's storyline almost feels like an afterthought, which admittedly is a bit of a problem for an RPG, and is one of *Oblivion's* few faults.

Just one of the many visages the savior of Cyrodill can assume.

The main quest, which has you filling the shoes of the unknown hero who's tasked with saving the world of Tamriel from a "terrible evil," takes a mere 15-20 hours to complete. And the road to its end is strewn with repetitive quests that basically have you closing all these gates to Oblivion (Tamriel's version of Hell), which pop up all over the place.

The upshot is that, while few people who bought *Morrowind* finished it, just about everyone should complete *Oblivion.* The game makes it next to impossible to get stuck, with handy compass pointers and map icons that lead the way to quest locations. The new leveling system, which ensures that every monster you fight is balanced to your current level, means you can make a beeline for the finish without needing to spend tedious hours grinding through lower-level monsters and hitting up sub-quests to buff up your character before you complete big fights. This completely removes the element of fear or dread that was present in *MW* every time you entered a dungeon—you never knew if you would find a level-30 badass or a just a bunch of level-1 rats.

Thanks to *Oblivion's* big picture, however, which includes a game world that looks and feels "alive" and that allows you to pretty much go anywhere, do anything, and be just about any type of character you wish (warrior, thief, mage, or any blend thereof), this point is rendered a mere niggle. There is simply so much to *do* in Cyrodill—you can even buy houses and horses and invest in stores. At times it feels like every one of the hundreds of NPCs you encounter needs your help with something—and many of these quests are quite clever, too. (In this way, *Oblivion* has much of the depth of a modern MMO.)

It's quite possible to spend 30 hours in the game without touching the main quest, if you take the time to smell all the roses. (Though you'll never smell 'em all, thanks to Bethesda's release of the TES Construction Set, which lets players develop mods—including new quests—for the game.)

Be forewarned, we've yet to see a game that thrashes even a high-end system as hard as this one. While this gives the *Maximum PC* staff a somewhat perverse pleasure, you might not take joy in getting 10-15fps with your new 7800 GT videocard. And the game did crash a few times, too—most often when we attempted to quit playing and get back to work.

It seems that even our PCs would "rather be playing *Oblivion*" than doing anything else.

—STEVE KLETT

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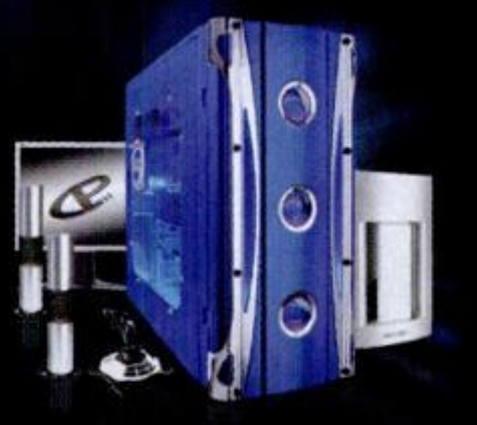

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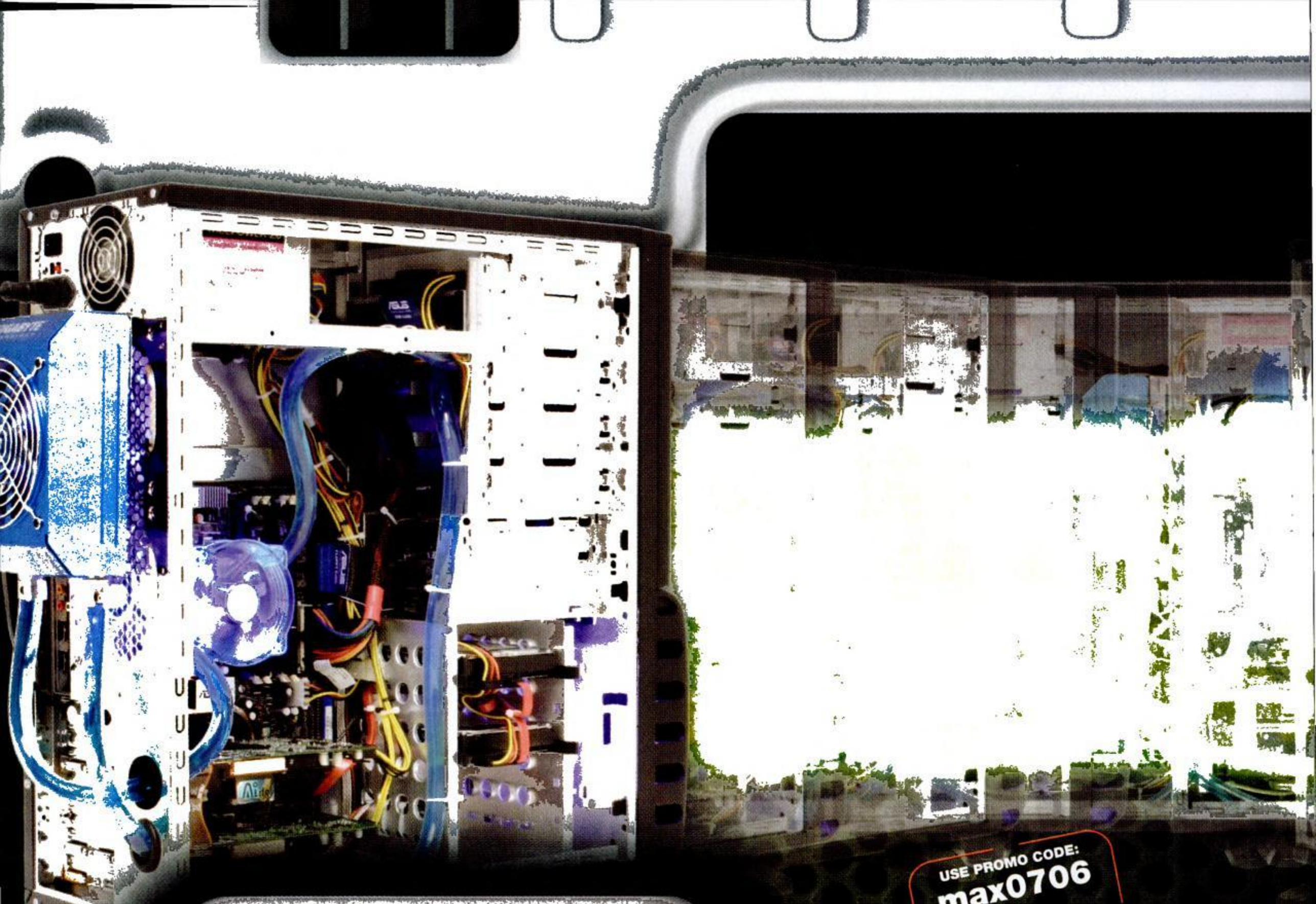

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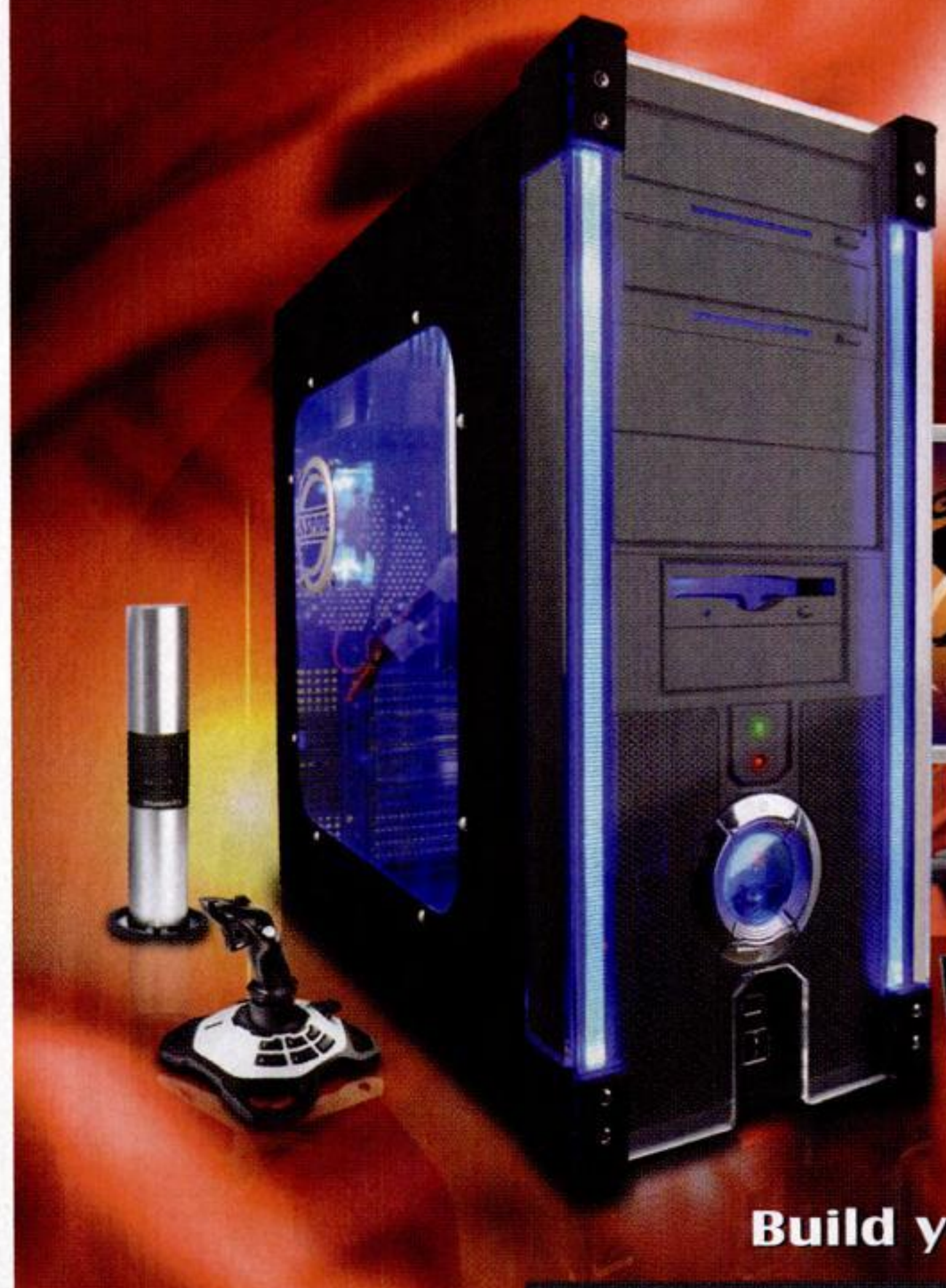

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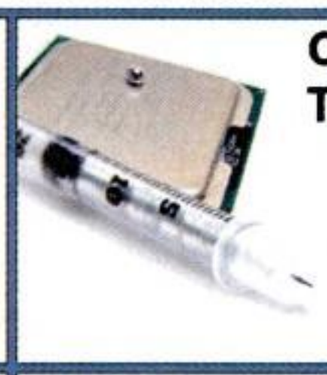

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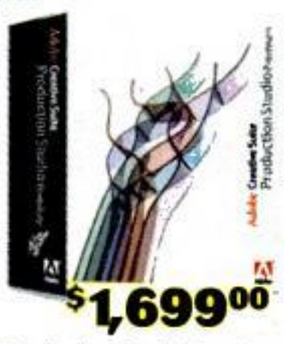

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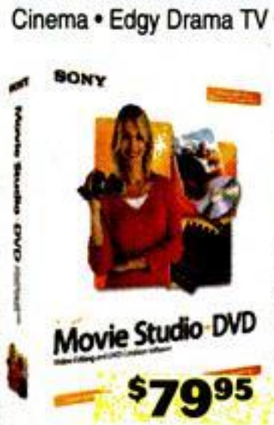

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SO WHAT'S STOPPING YOU?

TO ENTER: Your submission packet must contain your name, street address, and daytime phone number; no fewer than three high-res JPEGs (minimum size 1024x768) of your modified PC; and a 300-word description of what your PC represents and how it was modified. Emailed submissions should be sent to rig@maximumpc.com. Snail mail submissions should be sent to Rig of the Month, c/o Maximum PC, 4000 Shoreline Court, Suite 400, South San Francisco, CA 94080.

The judges will be *Maximum PC* editors, and they will base their decision on the following criteria: creativity and craftsmanship.

ONE ENTRY PER HOUSEHOLD. Your contest entry will be valid until (1) six months after its submission or (2) October 15, 2006, whichever date is earlier. Each month a winner will be chosen from the existing pool of valid entries, and featured in the Rig of the Month department of the magazine. The final winner in this contest will be announced in the January 2007 issue. Each of the judging criteria (creativity and craftsmanship) will be weighed equally at 50 percent. By entering this contest you agree that Future US, Inc. may use your name and your mod's likeness for promotional purposes without further payment. All prizes will be awarded and no minimum number of entries is required. Prizes won by minors will be awarded to their parents or legal guardians. Future US, Inc. is not responsible for damages or expenses that the winners might incur as a result of the Contest or the receipt of a prize, and winners are responsible for income taxes based on the value of the prize received. A list of winners may also be obtained by sending a stamped, self-addressed envelope to Future US, Inc. c/o Maximum PC Rig of the Month, 4000 Shoreline Ct, Suite 400, South San Francisco, CA 94080. This contest is limited to residents of the United States. No purchase necessary; void in Arizona, Maryland, Vermont, Puerto Rico, and where prohibited by law.

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We tackle tough reader questions on...

✓Spam Solutions ✓Pollen Problems ✓BTX ✓$1,000 PC ✓Accelero

SPAM SPAM SPAM EMAIL SPAM SPAM SPAM...

*Have you forgotten all about spam? I haven't seen anything about it in your magazine lately, but it's still a problem for a lot of users. I'm a simple **Outlook Express** user, and I want a simple spam filter—something accurate that integrates with **Outlook Express**, so when I receive spam, all I have to do is click it to get rid of it.*

Ideally, the app would be free and would support multiple POP accounts, and work with IMAP.

—Cody Sharp

EDITOR IN CHIEF WILL SMITH RESPONDS: Believe me, Cody, we certainly haven't forgotten about spam. We receive a constant deluge of junk email promising to cut our mortgage, help us lose weight, sell us watches at a bargain, win us free iPods, and increase the size of our… well, you get the drift.

We haven't really covered anti-spam utilities in a while because our last recommendation still stands: *SpamPal* (www.spampal.org) is one of the easiest ways to permanently reduce your daily dose of spam. Even better, the latest beta versions don't require any special configuration for your mail client to work, they just filter incoming spam.

By using *SpamPal* with a mail client that includes spam filtering, such as *Thunderbird* (www.mozilla.org), your spam load should shrink considerably. We're still looking for the spam cure, but until we get there, these apps make spam more manageable for us.

POLLEN PROBLEMS

I have an office with two big beautiful windows, which I like to leave open to let in the fresh air. I usually leave my machine running the Folding@Home program. Recently, when I returned to my desk, I noticed a buildup of pollen on my desk. When I checked inside my case, all the components were completely covered in pollen (seriously, covered!). I clean the case once per month, using a vacuum to clean filters (thoroughly) and canned air for the components (and their respective fans), but this cleanup took hours of dusting; I had to remove every component plus the power supply, and it took five bottles of air! Besides keeping the windows shut, how can I prevent this from happening again without completely suffocating my case?

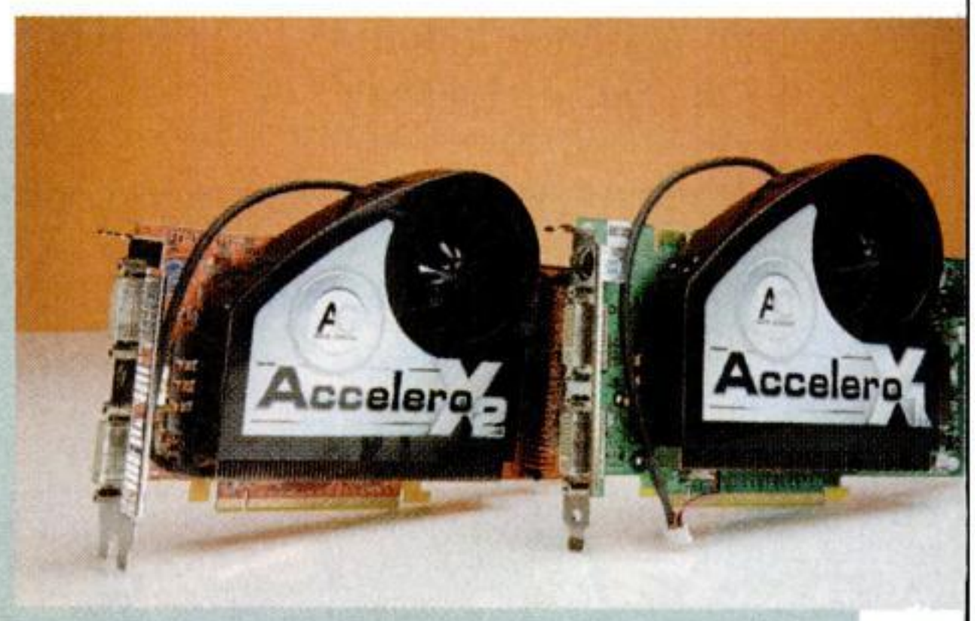
—Joe Marino

EDITOR IN CHIEF WILL SMITH RESPONDS: That's a dilly of a pickle of a problem, Joe. The only thing I can suggest is to replace the filters you're using with a material that has finer holes. The air filters that many case manufacturers use are more suitable for a central air-and-heating unit than for a PC. For years we've recommended using disposable dusting cloths to effectively filter a PC case; you'll find a quick and easy how-to

CUTCOPYPASTE

In the May issue we printed an incorrect URL for Arctic Cooling. The correct URL is **www.arctic-cooling.com**.

Arctic Cooler Ain't a 10



I just read your May 2006 issue and could not believe you gave the Artic Cooler Accelero a 10 verdict. You have usually been pretty good on your reviews, but to give this cooler a 10 is just crazy. That cooler pushes HOT air inside of the case, which will raise the temps of the other components, especially if you are using water-cooling and don't have fans to remove the heat.

If you read about that cooler on several web forums, you'll see that it's hated among the community as a bad cooler to buy. I just thought I'd let you know this. As always, your magazine is still my favorite!

—Makoto Cole

SENIOR EDITOR JOSH NOREM RESPONDS: Gee, I guess we better check with Hardcoreoverclockers.net before we go to print with any future reviews. Seriously, though, be careful what you read on the Internet. A lot of enthusiast-forum trolls talk a good game, but in reality they don't do any kind of testing to back up their assertions. This is especially true when it comes to cooling. For example, you bring up the fact that because the Accelero circulates air internally it's "hated" on several forums. You claim it will heat up other components and that will cause problems, which we didn't experience. But with its Accelero coolers, Arctic Cooling has abandoned an "exhaust" design in favor of the "circulating" design.

Why would the company do that if it's so bad for your system? We asked, and here's what the company's chief engineer said: "[The exhaust] reduces the air temperature in the computer case by about 1 C… [The disadvantage is that] a lot more pressure is used, therefore the fan generates a far higher noise level at the same performance." He went on to say: "For a modern, quiet, high-performance PC, an [exhaust] doesn't make sense. The 1 C plus in ambient temperature doesn't matter…." Regarding warming other components, he said: "The exhaust air of about 35-40 C is no problem for the mainboard. All components are specified for at least 85 C or more and therefore if these components run hot, the air stream works to cool them. The warm air rises automatically in the PC case and will be blown out by the case fans."

Satisfied? Needless to say, I stand by the 10 verdict, and suggest that the next time someone on the Internet makes a claim about performance or cooling, ask them to back it up with empirical data.

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on page 38. Luckily, tree pollen is usually only a problem for a couple weeks a year in most of North America, so even if you don't want to change your filters, the problem will probably take care of itself in a week or two.

WHAT EVER HAPPENED TO BTX?

I've been waiting for the motherboard vendors to release a new BTX formfactor for quite some time now. So what's going on with these companies? Are they starting to make BTX mobos, or is ATX the motherboard mainstay? Your May issue mentioned that there's going to be DDR3 memory coming out later in 2007, but there's nothing about the motherboards. Is there any news about the new motherboards? I'm dying to know because I want to upgrade my computer, and I don't want the new components to be obsolete within a few months.

—John J. Huh

SENIOR EDITOR GORDON MAH UNG RESPONDS: When we did our BTX story two years ago (July 2004), we thought Intel's prediction of widespread adoption by 2007 was tinged with irrational exuberance, but we didn't think BTX would falter as badly as it has. BTX isn't dead—Dell, Gateway, and a number of large OEMs are using it—but it's getting absolutely no traction with enthusiasts and white-box vendors. With Intel's move to low-wattage, cool-running CPUs (which negates the company's main reason for pushing BTX), we suspect that won't see mainstream BTX motherboards until 2009, if ever.

$1,000 PC, $0.02 WIRING JOB

Referring to the "$1,000 Gaming PC" feature (June 2006), the wiring was downright embarrassing. Please don't blame it on deadlines, sick cats, ingrown toenails; there is simply no excuse. I'm not expecting Voodoo-like magic, but really. Please apologize straight up and we can all move on. I know someone got a reprimand for the mess in that case. Did Rosanne's hairdresser join the staff ?

—Tom Wheeler

EDITOR IN CHIEF WILL SMITH RESPONDS: Actually, the problem was budgetary. By the time we spent a grand on the components, we didn't have the cash for the Italian cowhide Prada tie-downs that celebrity case-wirer Monty uses to work his magic. Josh did the best he could with his limited resources (and Army-surplus zip ties). We're sorry we let you down, Tom.

CD SNAFUS

My magazine subscription includes the Maximum CD, and I find the disc confounding at times. Each application has an "install" button. Some apps actually install when you click the button, but many of them do not install but, instead, simply run. ***Foxit Reader*** *and* ***Steganos LockNote****, for example, did not install but simply popped up a window running from the DVD. Having eliminated Adobe's reader in favor of* ***Foxit's****, I was a bit flummoxed when I later tried to read a PDF and nothing happened. I had to rummage around to find the right disc to see what the problem was.*

—Tim Joyce

SENIOR EDITOR JOSH NOREM RESPONDS: We've rectified this issue, but thanks for bringing it up. The problem was due to the fact that some of the applications on the disc don't include installers. Two great examples are *Steganos Locknote* and *Foxit PDF Reader*. We used to just put the EXE file in the folder and link it to the install button, so when you clicked "install" Foxit Reader would pop up. The problem, as Tim found out, was that the EXE for the program stayed on the Maximum CD, so when you clicked on a PDF link and the disc wasn't in the drive, nothing happened.

To solve this issue, we've begun putting anything that doesn't install into a ZIP file. For such apps, you'll see a "save" button rather than an "install" button. Clicking the "save" button opens the default file-compression utility, allowing you to save the files to your hard drive.

BOOTVIS BASHING

In your May issue you used ***bootvis*** *to help reduce your boot time. I tried it out and everything seemed OK, but then the hard drive started filling up. It took me a while but I pinpointed it to C:\Windows\System32\LogFiles\WMI\trace.log. After scouring the web to find out why this thing was taking over my drive space, I found a few posts that identified* ***bootvis*** *as the cause of the problem. You should advise your readers to turn off a registry key if they experience this symptom. Go to HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Control\WMI\GlobalLogger and double-click Start and change the setting from 1 to 0.*

—Richard Baumet

We ran *bootvis* on several machines to see if we could duplicate this issue, but couldn't. We did a little Googling, however, and sure enough, it's a common problem. The solution you propose is the one people should use if *bootvis* keeps creating logfiles. Thanks for the heads up. MPC

LETTERS POLICY: ***MAXIMUM PC*** invites your thoughts and comments. Send them to **input@maximumpc.com.** Please include your full name, town, and telephone number, and limit your letter to 300 words. Letters may be edited for space and clarity. Due to the vast amount of e-mail we receive, we cannot personally respond to each letter.

COMING NEXT MONTH IN MAXIMUM PC'S

YOU CAN'T HANDLE THE BENCHMARKS!

AUGUST ISSUE

VIDEOCARD MADNESS

All your videocard questions will be answered next month in our crazy, no-holds-barred videocard shootout! Every card in the Lab examined, benchmarked, and verdictized!

AMD'S NEW CPU

We've got the all-new Socket AM2 CPU from AMD, and we're taking you on a guided tour! Is it better than Socket 939? Read our first-look guide to find out!

CASE STUDIES

We've rounded up a dozen of the sexiest, sturdiest ATX cases on the market, and put them through their paces, one-by-one, in the gladiator's arena known as the Lab. This is the biggest case roundup we've ever done!

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MICHAEL MINKLER'S

Craftsman PC

Hey, if the Craftsman brand is an emblem of hands-on, down-and-dirty toolin' and tinkerin', then it's apt that the name emblazon a power user's PC. Looking at Michael Minkler's finished rig, you might even think that the mondo four-drawer, rolling tool chest were expressly made to house a computer. Of course, Minkler worked hard to create such a natural-looking fit, cutting holes for parts, and ports, and fans; adding an acrylic front window; and carefully planning the machine's layout and necessary cooling. The result: a fully outfitted PC ensconced in the top compartment, a nestling place for every peripheral, and storage aplenty in the chest's lower half for sundry computer gear.

Minkler positioned the DFI LAN Party mobo so that the "rear" access panel is conveniently located up top, alongside his PSU.

The wheels and extra storage on the full-size unit are certainly handy, but Minkler is free to detach the essentials for work on a desktop.

With room under the lid for a stored keyboard, mouse, and LCD, Minkler is ready to hit the next LAN party at a moment's notice. The box's built-in handle makes it easy to tote the 25lb. load-out.

A former flyboy, Minkler used the Air Force insignia for all his fan grills.

For his winning entry, Michael Minkler wins a $500 gift certificate for TigerDirect to fund his modding madness! See all the hardware deals at www.tigerdirect.com, and turn to page 92 for contest rules.

If you have a contender for Rig of the Month, e-mail **rig@maximumpc.com** with high-res digital pics and a 300-word write-up.

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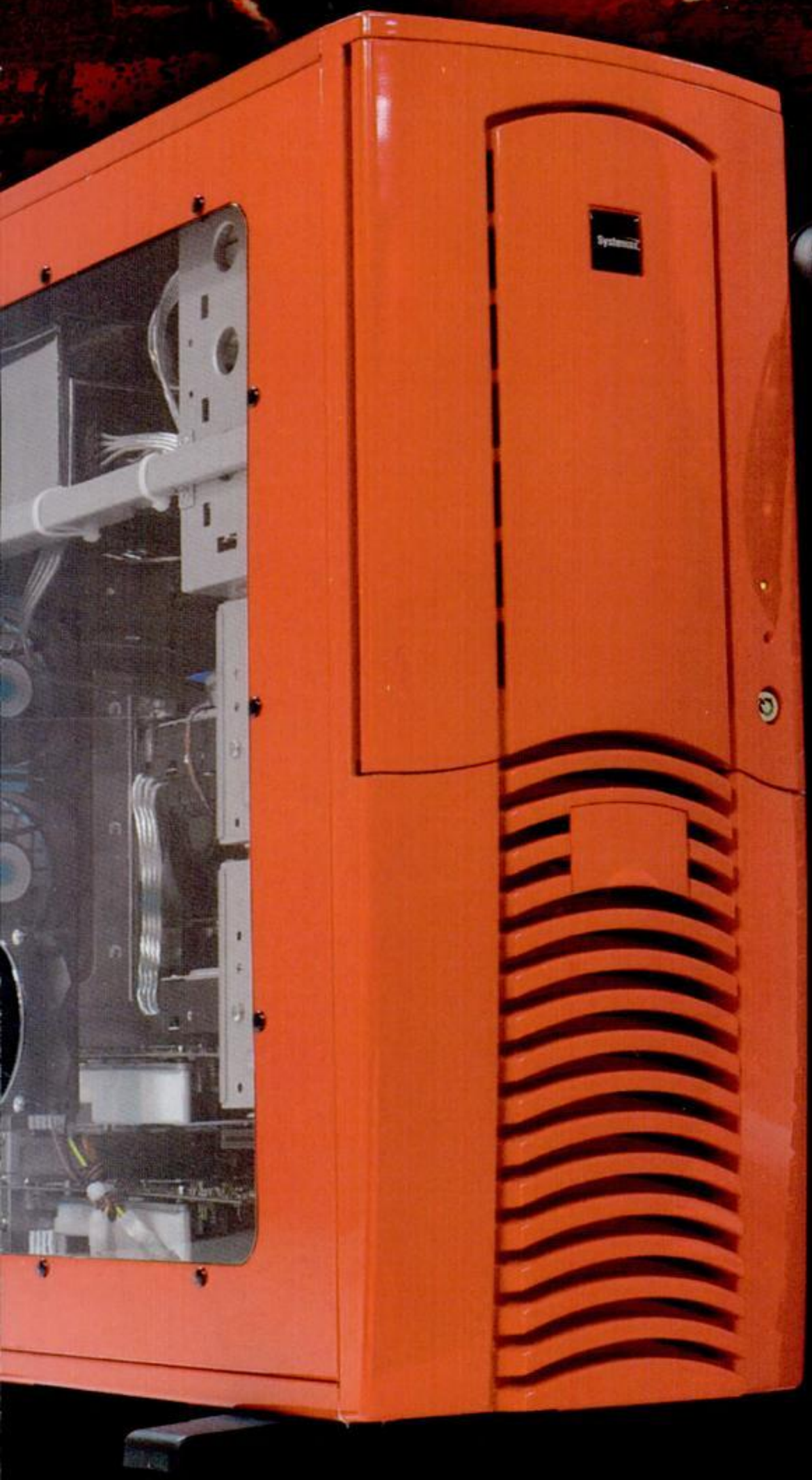

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